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Placing ICT in acculturation: A mixed methods study of mobile phones in the everyday life of the international student

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Preface

The intent of this dissertation and the body of work presented here is to provide a unique and relevant contribution to knowledge. This dissertation is an original piece of work that contains no material which has been accepted for another degree or award by the University of Tasmania or any other institution. Except by way of background information and due acknowledgment in this thesis, to the best of the candidate's knowledge and belief this dissertation contains no material previously published or written by another person except where due acknowledgment is made in the text of this dissertation.

This dissertation has received the required level of ethics approval for the three studies conducted from the Tasmania Social Sciences Human Research Ethics Committee (HREC) at the University of Tasmania. The ethics references are H0011913, H0013240, and H0013924.

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Harry Rolf
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Abstract

From the moment a person makes the decision to study at an education institution overseas their life will be in flux. The stress this causes, combined with new unfamiliar circumstances, geographic isolation and cultural difference, can magnify even common everyday issues into significant challenges which can have serious negative impacts on the student's adjustment to a host society – a process known as acculturation. Acculturation is defined as the change that occurs as the result of sustained first hand contact between individuals of differing cultural origins (Ward, Bochner, & Furnham, 2001). It is known that an international student will rely upon a wide range of Information and Communication Technologies (ICTs) for information and communication to keep themselves up-to-date and to respond quickly when issues arise during everyday life. But there is only a limited understanding when it comes to the role of new forms of ICTs, such as mobile phones, in the acculturation process and psychological or sociocultural outcomes.

The aim of this thesis has been to explore the role of Information and Communication Technology (ICT) in the acculturation process, as experienced by international students from a sociocultural perspective. This research problem has been addressed through a sequential emergent multiphase mixed methods research design in three phases.

Phase One explored the extent of ICT use during an international student's journey. Through a series of focus groups, accounts of collective experiences were captured in conversation with international students. Conversations were aided by a reflexive card sort exercise asking about modes and means of communication used by students at three stages of their journeys: life before departure, at arrival, and in their present situation. The process elicited a rich data set of collective experience, including the modes and means of communication (not only ICTs) valued and relied upon by students during their journey. Correspondence Analysis (Greenacre, 1984) revealed that in relation to other modes and means of communication the mobile phone was significant throughout a student's journey but that students took its role in their everyday life for granted.

Phase Two emerged from the results of Phase One where a broader picture of phone use was needed to interpret the apparent significance of the phone in the lives of international students. The Phase Two study was designed to focus on the relationship between mobile

phone use, situation and individual variables through a survey questionnaire administered to a sample of the student population. Statistical analysis of response data presents a picture of capable mobile phone users, who consistently use their phones to find information while staying in Tasmania. But exceptions were present – students who did not or could not make use of their phones in the same way as their peers. These results along with those from Phase One provided an understanding of the context and ways in which international students adopt, appropriate and use ICT, but an in-depth understanding of the mobile phone in an individual's everyday life was needed to better understand how and why the mobile phone was important.

Phase Three provides an in-depth understanding of the mobile phone in the everyday life for an international student. Being able to access information had emerged as an important reason for having a phone and the phase three study was designed to focus on describing the phone's place in a student's everyday information practice (Savolainen, 2008). In-depth interviews followed the Information Source Horizon (ISH) think aloud graphical drawing exercise (Savolainen & Kari, 2004) to map the importance of information sources, and understand how students valued and selected them when needs for information arose in their everyday lives. Interpretative Phenomenological Analysis (IPA) (J. A. Smith & Osborn, 2008), supported by content analysis of graphical drawings, showed that having a phone was central to everyday information practice but that the phone acted as a channel rather than a source of information itself. There were exceptions, however, and cases where having a phone was not important to information practice. Differences arose from individual and situational circumstances both past and present.

Results from the three phases were then mixed to form a set of findings relating to the importance of ICTs in the acculturation process as experienced by international students, with a focus on the use of mobile phones for communication and information in everyday life. Mixed method results reveal that during their sojourn an international student's life is in flux, as social life is disrupted and at times becomes unpredictable, but rather than needing to rebuild everyday life in a new context, having a phone allows an international student to maintain consistency in everyday life throughout the sojourn.

General models of the acculturation process are not sensitive to the increasing importance of ICTs or the highly mediated context of an international student's everyday life revealed by these results. If applied to understand the acculturation and adjustment of international

students, the use of existing models may lead to inconsistent assumptions being made about the acculturation experience. To address this an adapted model of the acculturation experience is presented, updated to include ICTs and other mediating factors in the acculturation process and better capture the acculturation experience of international students.

It might be assumed that the acculturation experience for an international student is a linear process, but the reality is that the journey experience will by cyclical, with short intermittent periods of time spent in both home and host societies. Results demonstrated that the use of a cyclical model in recurring stages (i.e. home, arrival and here) can more naturally capture an international student's sojourn experience. This led to the development of a cyclical model of the sojourn experience. The model demonstrates the relationship between an international student's sojourn experience and changes in ICT adoption and appropriation. It provides a means for further investigation and a greater understanding of the relationship between an international student's experience and mediating factors, like new forms of ICT, in their everyday lives.

Acknowledgments

The completion of this dissertation has only been made possible thanks to the enduring support and guidance of Professor Christopher Lueg and Dr. Leonie Ellis. I am deeply grateful for the patience and confidence that both Prof. Lueg and Dr. Ellis have shown me throughout this dissertation and for their willingness to endure what is best described as a journey. I know that I am a better, wiser person for it, and I hope that their experience has been equally rewarding. Thank you.

Thank you to the University of Tasmania and the many members of staff who have also provided me with support while carrying out this dissertation, and encouragement along the way. Thank you to the international students whose experiences form the foundation for this dissertation; this dissertation is also partially yours.

To my family and friends who thought that they would never see the end of this, here it is. Thank you for your support and constant 'motivation', it has made the journey bearable.

To Chee Fui Chin (Mey), thank you for sticking with me. Without your unwavering support and infinite patience from start to finish I could not have made this journey.

This dissertation is dedicated to my late grandfather Harry Messel, whose encouragement and words of wisdom kept me going, particularly his favourite saying: *The harder you work, the luckier you get.*

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1. Introduction

This chapter presents an introduction to this thesis that is organised in seven parts. Part one presents a background to the thesis by discussing three relevant domains of knowledge: the international student experience, Information and Communication Technologies (ICTs), and human migration and the issues associated with providing support to sojourning international students. Part two presents the research problem addressed by the thesis. Part three presents the research approach adopted to address the research problem. Part four presents a summary of the aims and research questions which guided investigation of the research problem. Part five presents a summary of the contributions which this thesis makes to scholarship. Part six presents the limitations of research conducted for this thesis. Part seven presents an overview of the thesis structure.

- Part 1.1 presents a background to the research, it covers the international student experience, ICTs and human migration and the issues associated with supporting international students during adjustment.
- Part 1.2 presents the research problem.
- Part 1.3 presents the research approach.
- Part 1.4 presents the research aims and questions.
- Part 1.5 presents the contributions of this thesis.
- Part 1.6 presents the limitations and future research.
- Part 1.7 presents an overview of the thesis structure.

1.1. Background

This thesis presents an investigation of the role that Information Communication Technologies (ICTs) play in the acculturation experience of an international student, by understanding the case of the mobile phone in an international student's everyday life. The research has been undertaken from a trans-disciplinary perspective, but is grounded in its interest in the experience of international students, information, communication and technology. The motivation behind the thesis is to improve support for international students staying in Tasmania, Australia, and thus their experience of the process of adjustment, and to

understand the acculturation experience of an international student in the context of Tasmania.

Research addresses a perceived knowledge gap between current understanding of an international student's acculturation experience and the paradigm shift taking place in human migration driven by new forms of ICT.

This part of Chapter 1 presents a background to the thesis in three parts. Part one presents a description of the international student experience from an acculturation perspective, describing the needs and challenges faced by this group of migrants. In contrast, part two discusses how ICTs are reconfiguring human migration, altering patterns of mobility through their impact on communication and travel. To frame the research problem part three discusses the issue of support provision and how current understandings of the acculturation experience do not align with the changes being observed in human migration caused by the adoption and appropriation of new ICTs by migrant groups.

1.1.1. The international student experience

For an international student embarking on sojourn is a significant life event, even before they arrive in a host country a students' life will be in flux as they begin to adapt on many levels to the new life circumstances and unfamiliar situations the sojourn has in store. The sojourn – a short stay in a new place can be characterized by a relatively short stay of between 6 months to 5 years in a host country with trips home in between – but where returning home is an anticipated outcome (Ward et al., 2001, p. 142).

The term sojourner describes between-society cultural travellers 'it reflects the assumption that their stay is temporary, and that there is the intention to return to the culture of origin once the purpose of the visit has been achieved' (Ward et al., 2001, p. 6). This group of migrants is often seen as distinct from other long term intercultural travellers like immigrants and refugees who are assumed to move between countries on a permanent basis.

However, at a time when understandings of traditional paradigms of human migration are being challenged by new and emerging forms of human mobility and communication, such categories only serve to loosely describe the situations of migrants. In this context the term migrant can broadly describe any person living outside of their country of birth or citizenship for a period of time (Caidi & Allard, 2005).

International students are a group of migrants who traverse the boundaries between traditional and modern paradigms of human migration. These modern migrants are being afforded new practices through the appropriation of digital technologies which give rise to paradigms of the 'connected migrant' and the 'networked individual', challenging traditional assumptions about human migration. Migration has become a process of continuous connection and circulation between communities and environments rather than a severing of ties and a process of resettlement.

Even so international students arriving in foreign countries such as Australia are still likely to be confronted with many challenges, exacerbated by the country's geographical isolation and confronting cultural differences. The stress of this experience, along with other emerging problems, can have a serious negative impact on an international student's mental and physical wellbeing while they adjust to everyday life in the host country. The sojourn experience can magnify even common student issues such as self-confidence, academic ability and support needs, turning them into significant issues that can have a serious negative impact on the student's adaptation to the host society.

The adjustment process that cultural travels like international students staying in foreign cultural environments go through is known as acculturation. Acculturation can best be described as the process of adaptation (or change) that occurs when groups of individuals having different cultures come into contact (Berry 1997). Ideally the process of acculturation leads to integration within the host society, but it also helps to explain what happens when things go wrong, for instance when an individual experiences Culture Shock. Adaptation rather than integration is the outcome of acculturation and adaptation refers to a set of outcomes arising from adjustment. These outcomes can be grouped into two categories: internal psychological outcomes including mental health, a sense of identity and satisfaction; and external sociocultural outcomes that link individuals to their new context, including their ability to manage daily challenges and participate in the host society (Berry, 1997; Ward et al., 2001).

The process of adjustment that students undergo while on sojourn is not straight forward. The situations experienced by students are more often than not challenging and confronting. They give rise to needs for support relating to issues from language to transportation, accommodation, health and many other areas of daily life (R. A. Smith & Khawaja, 2011).

Two factors which have an important effect on socio-cultural adaptation and help meet the needs arising from the adjustment process for international students are access to social support and the availability of information during the sojourn.

A student's friends are known to help them overcome many of the challenges they will face during everyday life while on sojourn – friends act as an informal support network when challenges and needs arise (Collins 2008; Brooks and Waters 2012). Having access to friends provides a source of social support, this support is multi-dimensional in nature and can consist of emotional, instrumental, informational and environmental support (Song, Son et al. 2011). Through their friends, international students can acquire information about jobs, food and shelter, explore their surroundings and meet many of the needs that arise of the challenges they will face in their daily lives (Brown 2009; Khawaja G and Stallman 2011).

However, to have access to this support on arrival international students will need to stay in touch with their existing social ties and confront the daunting prospect of having to make new friends while staying in the host society (Neri and Ville 2008; Meier and Daniels 2011). Studies of international student adjustment find that they are most likely to make friends with other co-nationals out of a need for easy communication in their native language, maintaining their cultural identity and access to practical (instrumental) support. They are then unlikely to make friends with host-nationals who can provide significantly better support through their local knowledge and experience (Bochner, Huntnik et al. 1986; Furnham 2007; Brooks and Waters 2012).

For an international student, having access to other sources of information is also essential; it helps them adjust to the foreign cultural environment and settle into the new society. But the new circumstances that international students find themselves in may mean that established habits of information seeking will need to change or new habits be established as they adapt to the new environment. This may also mean that information sources and channels previously relied upon are no longer available or relevant in the new circumstances. As Savolainen (2008) points out, 'individuals will need to make sense of the values and patterns in their lives, which are generally in flux' (p. 501).

It is known that international students, similarly to other migrant groups, make use of a range of information sources and channels that includes their social networks, ICTs, media and

other formal and informal sources and channels to keep themselves up-to-date or respond to specific needs during their daily lives. But little is known about the selection or use of specific information sources or channels and their roles during information seeking while on sojourn. Existing scholarship on international students' information seeking behaviour has tended to focus on the academic side of a student's life, specifically academic information needs in organisational settings such as the library or class room. Less attention has been paid to the Everyday Life Information Seeking (ELIS) of these students or their information needs and information seeking behaviour. While some studies have begun to demonstrate the potential that certain kinds of ICT such as social software have for providing information to international students (Sin and Kim 2013), the significance of digital technology presents important opportunities to improve services and support to international students.

1.1.2. ICTs and human migration

The inclusion of new ICTs by migrants into aspects of their everyday lives is transforming the paradigms of human migration, by reconfiguring traditional forms of human motilities. New forms of digital technology afford new forms of social practice which challenge views and understandings inherent in traditional forms of human migration. This paradigm shift is having a significant effect on the experience of cultural travellers, be they migrants, tourists, workers, refugees or international students. Nowhere are these effects of new digital technologies more noticeable than in the lives of migrants living far from home. These groups also stand to gain the most benefit from the appropriation of technologies, whose effects are directly linked to improving many of the negative impacts migration has.

The influence of new digital technologies like mobile phones on human behaviour (mobility and communication) is also reconfiguring traditional understandings of this social phenomena. The experience differs depending on the groups of migrants concerned, groups which are commonly distinguished based on the motivations for migration, the intended length of stay and the nationality of individuals.

As a group of connected migrants (Diminescu, 2008), international students are easily able to stay in touch with their friends, families and other social ties while on sojourn, through their use of ICT. Existing studies show that a wide range of communication technologies are often employed in strategies to maintain relationships and manage social networks while abroad (Williams, Dourish et al. 2008; Khawaja G and Stallman 2011).

Social networks are often mediated by ICTs such as a laptop, mobile phone, personal computer or another kind of personal device. This technology enables students to stay in touch with social ties while abroad and to seek assistance when a need arises. As a mediator, ICT may also act as a channel of information, or provide access to other sources of information through internet connectivity such as a website, social software and many other services and applications.

It has also been identified that this appropriation of technology can have a negative impact on the sociality of international students. By re-enforcing cultural barriers and maintaining strong ties with other co-nationals, the connections maintained through the use of technology potentially limit students' opportunities to meet local people and makes adjusting much more difficult (Collins 2009).

1.1.3. Supporting international students

ICT offers important opportunities for engaging international students and for providing support services that are immediately accessible to them when issues arise, as is common during adjustment. ICTs and particularly the internet have been identified as offering new opportunities for engagement and the provision of support and information services (DEST 2005; Codagnone and Kluzer 2011).

However, although studies have been conducted which show the significance of ICT appropriation by migrant populations and their role in settlement (Codagnone and Kluzer 2011; Rissola 2013), little is known of the role that specific kinds of ICT such as mobile phones play in the daily lives of migrants or specific subgroups, including international students (Kyung-Sun Kim, Yoo-Lee, & Sin, 2011). Little is known about how or why certain kinds of technology are used by international students, particularly in different countries or socio-cultural contexts. Are new forms of digital technology like the mobile phone or the internet allowing international students to easily stay in touch with friends and family in different contexts? Is it the case that just like other groups of migrants an international student will have access to social support and other sources of information through these technologies where ever they go? To what extent does the new paradigm apply? These questions are important to answer substantively; a lack of understanding may lead to incorrect assumptions being made when providing support for international students on sojourn or when trying to understand their acculturation experience.

1.2. The research problem

This part of Chapter 1 presents the research problem. The discussion presented in Part 1.1 of this thesis highlights a gap in existing knowledge when it comes to the role of ICTs in the acculturation experience of an international student. Thus the aim of this thesis is to understand the role of ICTs in the acculturation experience of an international student. This research problem can be expressed as the following question:

- *What is the role of Information and Communication Technology(s) in the acculturation experience of an international student?*

1.3. The research approach

This part of Chapter 1 presents the methodological approach adopted to understand the research problem. To investigate the research problem a sequential multi-phase mixed methods design was followed in three phases: Phase One, Phase Two and Phase Three. The research approach is summarised in Figure 1, and the associated aims and research questions for each phase are presented in Part 1.4 of this chapter.

The purpose for adopting a mixed methods research design was for methodological triangulation. The application of multiple methods to understand the correspondence between different aspects of the research problem provided a clearer understanding of ICTs in the acculturation process. Methodological triangulation allowed the strengths of different methods to be leveraged in an investigation of particular aspects of the international student experience of acculturation.

The Phase One study was designed to address an aim and series of supporting research questions arising from the research problem. The aim was to explore the use of ICTs in the communication practices of international students. The study was underpinned by an interpretivist research paradigm, an idealist ontology, a social constructionist epistemology, and an abductive research strategy (Blaikie, 2007). The method adopted was the focus group interview technique (Barbour, 2007), supported by a Multiple Sort Procedure (MSP) (Barnett, 2004). Analysis involved content analysis of focus group interview transcripts and Correspondence Analysis (CA) of MSP data. Results revealed that ICTs changed at different stages of the sojourn experience, but that mobile phone use was relatively consistent.

Participant accounts indicated that the phone was essential for many of their communication practices but that its presence was taken for granted.

The Phase Two study was designed to explain results from the Phase One study in greater detail. The study was also guided by an aim and set of supporting research questions. The aim was to describe the relationship between mobile phone use and a range of potentially associated variables. The study was underpinned by a post-positivist research paradigm, a subtle realist ontology, a conventionalist epistemology and an inductive research strategy (Blaikie, 2007). The method adopted for this study was the research survey technique, using a questionnaire developed by the researcher (Bradburn, Sudman, & Wansink, 2004). Analysis involved exploratory analysis, Mokken Scale Analysis (MSA) and bivariate analysis techniques including Spearman's Rank correlation coefficient(Pirie, 2004). Results indicated that mobile phones were frequently used, and that an international student's phone capability was an important issue that could affect their ability to operate effectively while on sojourn.

The Phase Three study was designed to understand results from the Phase Two study more deeply. The study was also guided by an aim and set of supporting research questions. The aim was to understand the role of a mobile phone in the everyday information practices of an international student. The study was underpinned by a hermeneutic research paradigm, subtle realist ontology, social constructionist epistemology and abductive research strategy (Blaikie, 2007). The method adopted for this study was the semi-structured research interview, supported by an Information Source Horizon (ISH) think aloud mapping exercise (Savolainen, 2008). Analysis involved Qualitative Content Analysis (Elo & Kyngäs, 2008), Interpretative Phenomenological Analysis (IPA) (Smith & Osborn, 2008) and cognitive map analysis (Langfield-Smith & Wirth, 1992). Results indicated that a phone was central to the everyday information practices of an international student. They showed how having a phone provided consistency and continuity, and also how it altered what was perceived as relevant for the interests and issues of everyday life.

On completion of the three phases results were brought together and mixed methods analysis carried out. This involved interpretation of results from each study by the researcher to address a series of mixed methods research questions and the research problem. Mixing methods is known to inherently give rise to methodological inconsistencies and potentially conflicts (Lincoln, Lynham, & Guba, 2011). These issues were managed through a dialectical

approach (Jennifer C. Greene, 2007) where methodological inconsistences are dealt with through a transparent discourse that engages with difference. The strategy employed to connect data analysis between phases was achieved by ensuring that the design of each phase was carefully linked to the results of the preceding phases and the research problem through both method and theory. In this way, methodological triangulation was achieved and results were able to be interpreted to address the research problem and a set of findings for this thesis.

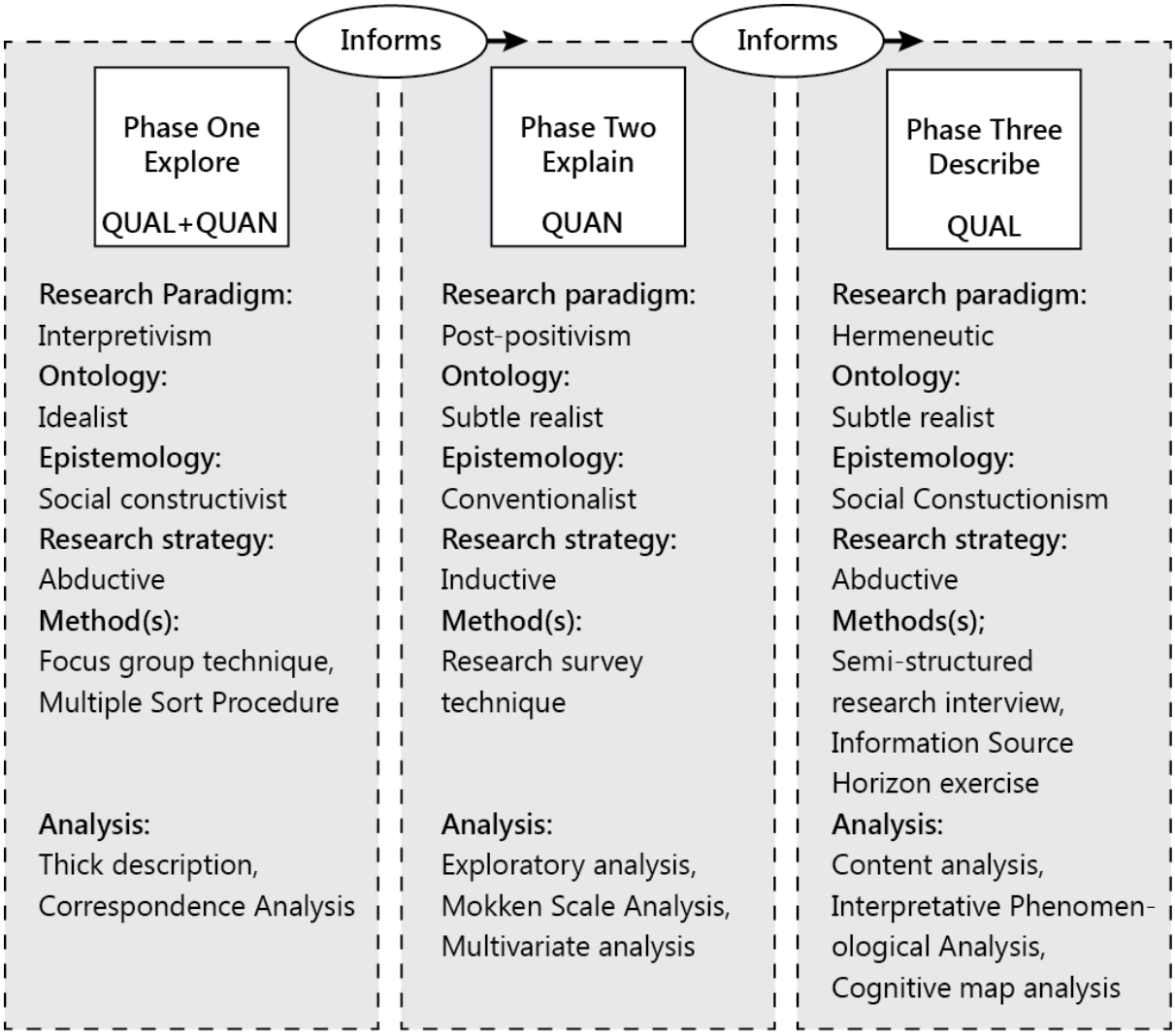


Figure 1: Summary of the mixed methods research approach

1.4. Research aims and questions

This section presents the aims and research questions which guided investigation of the research problem across the three phases of research and the associated mixed methods research questions. The research problem articulated as a research aim and three mixed methods research questions which guided the mixed method analysis are presented in Table 1. The research aim(s) and associated research questions are presented for the Phase One study in Table 2, for Phase Two study in Table 3 and for Phase Three in Table 4.

The research problem and mixed methods research questions	
Research Problem	What is the role of Information and Communication Technology(s) in the acculturation experience of an international student?
MM-RQ1	In what ways did the Phase Two study explain the Phase One study findings?
MM-RQ2	In what ways did the Phase Three study provide a better understanding of findings in the Phase Two study?
MM-RQ3	In what ways have the results from Phases One, Two and Three addressed the research problem?

Table 1: The research problem and mixed methods research questions

The Phase One study aim and research questions	
Aim	To explore the use of Information and Communication Technology (ICT) by international students in interactions with important people in their lives at different stages of their sojourn.
RQ1	To what extent are ICTs used by international students in their communication practices while on sojourn?
RQ2	What are the *modes* and *means* of communication associated with certain practices?
RQ3	Why are certain ICTs used or not used?

RQ4	To what extent does ICT use change while on sojourn?

Table 2: The Phase One study aim and research questions

The Phase Two study aim and research questions	
Aim	To investigate the relationship between mobile phone use and other variables of interest within a sample of international students staying in Tasmania.
RQ1	To what extent and in what ways are mobile phones used by international students?
RQ2	To what extent are mobile phones used to access support information?
RQ3	To what extent do international students rely on their mobile phones?
RQ4	Is there a significant difference between those with smart phones and those without?
RQ5	Is there a significant difference between 'first year' international students and those in later years?

Table 3: The Phase Two study aim and research questions

The Phase Three study aim and research questions	
Aim	To understand the role of a mobile phone in an international student's Everyday Life Information Seeking (ELIS), as a particular case of ICT in an international student's everyday life.
RQ1	Which information sources and channels are preferred by international students when seeking orienting information?
RQ2	In what ways are information sources and channels preferred by international students?
RQ3	To what extent and in what ways are mobile phones important to everyday life information seeking practices?
RQ4	In what ways are mobile phones positioned in relation to other sources and channels in international students' Information Source Horizons?
RQ5	How do international students select and value information sources and channels in their everyday information practices?

Table 4: The Phase Three study aim and research questions

1.5. Research contributions

This part of Chapter 1 presents the significant contributions made by this thesis at a substantive, methodological and theoretical level.

The substantive contribution of this thesis is an improved understanding of the role that ICTs play as mediating factors in the acculturation experience of an international student. This is achieved through an examination of the mobile phone over three sequential studies in an emergent mixed methods process designed to support methodological triangulation. A Phase One study explored the use of the mobile phone and other ICTs in international students' communication practices. A Phase Two study explained patterns of phone use emerging from the Phase One study, and a Phase Three study described in greater detail the importance of a phone for everyday information practices. As the research was undertaken in Tasmania, and engaged international students studying at the University of Tasmania, it also provides an understanding of the acculturation experience of international students in this specific cultural context.

This thesis makes three significant methodological contributions. The first contribution is made by the Phase One study where a methodological approach is presented for evaluating the relevance of ICTs to an international student's sojourn experience. The second contribution is made by the Phase Two study, which presents the development and evaluation of a scale instrument for measuring a person's perceived capability to use their mobile phone. The third contribution is made by the Phase Three study, which provides an evaluation of the methodological approach used by Savolainen (2008) for understanding everyday information practices, as well as identifying a key limitation of the underlying 'regions of relevance' model.

This thesis makes two significant contributions to theory. The first theoretical contribution is an adapted model of the acculturation process described by (Ward et al., 2001), which captures the mediating effect that a phone and potentially other ICTs have on contextual factors and individual, situational and societal level variables in the acculturation experience. The second theoretical contribution is the development and presentation of an original conceptual model of the sojourn experience for an international student. The model describes

the relationship between three significant stages in the sojourn experience and the perceived importance of ICTs in the sojourn experience for individuals and groups.

1.6. Research limitations

This part of Chapter 1 presents the limitations of research conducted for this thesis. Three significant kinds of limitations were encountered, limitations caused by methodological complexity, limitations in validity and reliability, and limitations in participant recruitment.

The sequential emergent multiphase mixed methods research design adopted for this thesis limited the level of detail able to be provided in the presentation of the research. A narrow scope has needed to be maintained in the presentation of results, which introduces potential bias on behalf of the researcher where decisions are made to include or not include information, particularly where accounts of participants are concerned. An example is that the presentation of rich descriptions about the Tasmanian context have been secondary to addressing the specific research aims of the thesis.

A mixed methods research design by its nature places limitations on the validity and reliability that can be achieved when different methods and thus different research paradigms are brought together. This limitation has been managed through engagement with the methodological literature, and by adopting a dialectical approach where methods and their differences are clearly articulated. The relationship between phases in the research design was also carefully planned and the connection between results and analysis guided by a series of mixed methods research questions that supported methodological triangulation of the research problem.

Recruiting international students as research participants was a challenge for each phase of the research. This limitation meant that fewer international students participated in the Phase One (n = 9) and Phase Two (n = 63) studies than were recruited or desired. A purposeful recruitment strategy turned out to provide the best recruitment results, and for the Phase Three study (n = 15) all recruited international students participated. This limitation meant that probability sampling was not achieved and this limits the direct generalisability of results. The purposeful recruitment strategy also introduced bias on behalf of the researcher where decisions of who, where and how to recruit participants have been made.

1.7. Overview of the thesis

1.7.1. Chapter 2: Literature review

Chapter 2 provides a review of the literature relevant to this thesis and is presented across four relevant domains. Part two presents literature relevant to international education, it covers international education in the Australian context and the international student experience. Part three presents theoretical concepts relevant to the adjustment process, the concepts include acculturation, social support, social exclusion and inclusion, and the settlement process. Part four presents literature about the modern migrants, it covers the mobility paradigm, the difference between ICT adoption and appropriation and the mobile phone. Part five presents literature on human information behaviour, specifically focusing on Everyday Life Information Seeking (ELIS), everyday information practices, the practice approach and the concept of information horizons.

1.7.2. Chapter 3: Methodology

Chapter 3 presents the methodology which underpins this thesis and it covers four main topics. Part two covers the mixed methods methodological approach, explaining what is meant by mixed methods research, how to purposefully mix methods and choose a mixed methods research design. Part three presents the sequential emergent multiphase mixed methods research design adopted for this thesis. Part four provides a discussion of paradigms in research. Discussion covers the elements of a research paradigm, and paradigmatic inconsistencies in mixed methods research. It goes on to present the positions of paradigmatic purity, pragmatism and the dialectic stance. Part five describes how theory may be included in research, discussing the role of theory and the research strategy in achieving this goal

1.7.3. Chapter 4: Phase One research design

Chapter 4 presents the research design for the Phase One study in four parts. Part two provides a background to the study, covering the topics of the research aim and associated research questions, the paradigmatic assumptions which underpin the study and the profile of participants. Part three presents the methods of data collection, these include the focus group interview technique and the Multiple Sort Procedure (MSP). Part four presents the techniques for data analysis which include a thick description of focus group discussions and the multidimensional analysis technique of Correspondence Analysis (CA). Part five presents the

study procedures and process, covering the topics of participant recruitment and procedures for the focus group sessions.

1.7.4. Chapter 5: Phase One results and discussion

Chapter 5 presents the results and discussion for the Phase One study in two parts. Part two provides a presentation of the results generated from analysis of the MSP card sort data and thick description of the focus group discussions. Part three provides a discussion of results in relation to the study aim and research questions.

1.7.5. Chapter 6: Phase Two research design

Chapter 6 presents the research design of the Phase Two study in four parts. Part two provides a background to the study, covering the topics of the research aim and associated research questions, the paradigmatic assumptions which underpin the study and the profile of participants. Part three presents the research questionnaire as a method for data collection. Part four presents techniques for data analysis, these include exploratory data analysis and scale development, which includes Mokken Scale Analysis (MSA) and procedures to evaluate the monotonicity of a Mokken scale. Part five presents the participant recruitment strategies and survey procedures adopted by the study.

1.7.6. Chapter 7: Phase Two results and discussion

Chapter 7 presents the results and discussion for the Phase Two study in two parts. Part two presents the results of analysis, including descriptive statistics, scale analysis of questions 5.b and 5.c that measure mobile phone capability and use of the phone for finding information respectively, and results which specifically relate to mobile phone use and the relationship between key variables. Part three presents a discussion of the results to address the study aim and research questions.

1.7.7. Chapter 8: Phase Three research design

Chapter 8 presents the research design for the Phase Three study in four parts. Part two provides a background to the study, covering the topics of the research aim and associated research questions, the paradigmatic assumptions which underpin the study and the profile of participants. Part three presents the methods of data collection, which include the semi-structured interview and Information Source Horizon (ISH) mapping exercise for understanding information source and channel preferences. Part four presents the techniques for data analysis, which include Interpretative Phenomenological Analysis (IPA) and

techniques for analysing ISH maps that include Qualitative Content Analysis (QCA) and cognitive map analysis. Part five presents the study procedures and processes which include the recruitment strategy and interview procedures.

1.7.8. Chapter 9: Phase Three results and discussion

Chapter 9 presents the results of analysis and a discussion of results in four parts. Part two presents the results of participant recruitment, providing information about the international students interviewed. Part three presents results from analysis of the ISH maps describing results of QCA and cognitive map analysis. Part four presents results of IPA, describing twenty Master Themes emerging through analysis and associated accounts of interview participants. Part five presents a discussion of results in relation to the study aim and guiding research questions.

1.7.9. Chapter 10: Mixed methods findings

Chapter 10 presents the mixed methods findings of this thesis in three parts. Part two presents the sequential emergent multiphase mixed methods design, a summary of the research problem and the mixed methods research questions which guided the design of each phase of research. Part three presents a summary of the multiphase design, describing the procedures and products of the Phase One, Phase Two and Phase Three studies. Part four presents the mixed methods findings, which are presented in relation to the mixed methods research questions and the research problem.

1.7.10. Chapter 11: Conclusions

Chapter 11 provides a conclusion to this thesis in five parts. Part two provides a summary of the research findings. Part three presents the practical significance of the thesis findings. Part four presents the approach taken in this thesis towards validity and reliability. Part five presents a discussion of the limitations to this thesis, and part six presents opportunities for future work emerging from this thesis.

1.8. Summary

This chapter provides an introduction to this thesis in seven parts. Part 1.1 of this chapter backgrounds the research through a discussion of three relevant domains of knowledge. Part 1.2 of this chapter identifies the research problem. Part 1.3 of this chapter outlines the research approach. Part 1.4 of this chapter presents the research aims and research questions. Part 1.5 of this chapter describes the contributions to scholarship made by this thesis at a substantial, methodological and theoretical level. Part 1.6 of this chapter presents the limitations faced by this thesis; and Part 1.7 of this chapter presents an overview of the thesis document.

2. Literature review

2.1. Introduction

This chapter presents a review of literature across four distinct domains of knowledge, international education, the adjustment process for international students, the paradigm of the modern migrant and everyday information practice.

Part two presents a description of international education with a focus on the context of international education in Australia and the international student experience, International education provides the context in which international students find themselves, internationalisation of higher education provides the pathways and opportunities which make their journeys possible. Part three presents concepts related to the adjustment process which include the acculturation experience, social support, social exclusions and inclusion as well as the concept of settlement distinct from acculturation. The adjustment process describes how international students experience the sojourn and can help explain the factors both socio-cultural and cognitive which contribute to outcomes like social integration, acculturation and even culture shock. Part four presents the concept of the 'modern migrant' describing the mobility paradigm, the difference between Information and Communication Technology (ICT) adoption and appropriation along with scholarship that relates to the mobile phone. The concept defines the changing nature of human migration and the new situations that migrants find themselves in shaped by factors like the mobile phone. Part five presents the concept of everyday life information seeking by providing a description of the theory of Everyday Life Information Seeking (ELIS), Everyday Information Practices, the practice approach and the concept of an information source horizon developed to understand these phenomena. This theory offers a lens through which the place of mobile phones in the lives of an international students 'modern migrants' and the changing nature of their sojourns can be understood.

- Part 2.2 presents a description of international education, the Australian context and the international student experience.
- Part 2.3 presents four concepts related to the adjustment process: acculturation, social support, social exclusion and inclusion, and settlement.
- Part 2.4 presents concepts in three domains that relate to the modern migrant: the mobility paradigm, ICT adoption and appropriation, and the mobile phone.

- Part 2.5 presents four concepts that relate to everyday life information seeking. The theory of Everyday Life Information Seeking (ELIS), the theory of Everyday Information Practice, the practice approach and the concept of Information Source Horizons.

2.2. International education

This part of Chapter 2 covers topics related to international education, and is organised into two sections: 2.2.1 provides information about international education in Australia, and section 2.2.2 provides a description of the international student experience.

2.2.1. The Australian context

This section provides information about the context of international education in Australia. In Australia a growing internationalisation agenda has led to an increasingly large number of international students coming to study at universities and other educational institutions. Over this time social, political and economic activities between Australia and its regional and international partners have established bridges across physical, social and cultural distances. The significance of international education to Australia is evidenced by the Australian Government's National Strategy for International Education 2025 where it is identified as Australia's top service export worth some $19 billion in 2015 (Australian Government, 2016). Australia is a key destination for international students, ranking as the third most popular destination next to the United States and the United Kingdom in 2012 (OECD, 2012); in 2014 international students made up 18% of tertiary enrolments, 10% above the OECD average of 8% (OECD, 2014). Attracting and retaining international students has become a priority for Australian tertiary institutions and their significance to Australia is clearly recognised by the Australian Government.

2.2.2. International student experience

The journey for an international student is not straightforward, students will be faced with many challenges while on sojourn – 'a temporary stay in a new place' (Ward et al., 2001, p. 142). As a group of modern migrants, international students are at risk of being overwhelmed by the experience of arriving in a foreign cultural and social environment. A student may become lost in translation as they adapt to a distant and unfamiliar socio-cultural environment – they may experience a condition known as culture shock (Zhou, Jindal-Snape, Topping, & Todman, 2008). To reduce the risk of a student experiencing culture shock it is critical that

appropriate support is provided to help students adjust and adapt to life in the host country (Lawson, 2012). The challenge of providing support to international students is faced by tertiary education institutions around the world in what is becoming an increasingly complex socio-cultural environment, with diverse populations of students and a highly competitive business (Australian Government, 2016; COAG, 2010).

Tertiary institutions, government and other concerned organisations or individuals commonly approach the issue of support as a problem requiring a solution. This is an approach emphasised in literature on socio-cultural adjustment and the study of inter-cultural contact (Smith & Khawaja, 2011). For students embarking on their sojourn it means leaving their homes far behind, to live in a distant and often unfamiliar environment. International students arriving in foreign countries such as Australia are likely to be confronted with many challenges, exacerbated by the country's geographical isolation and confronting cultural differences. In this adjustment process even common student issues such as self-confidence, academic ability and support needs are magnified, becoming significant issues that can have a serious impact on the student's adjustment and ability to cope with the stresses of daily life (Ramsay, Jones, & Baker, 2007).

Studies of international student experience often focus on the stressors – the issues and needs arising from life changes, and socio-cultural difference. Studies will focus on how international students respond to these needs (Khawaja & Stallman, 2011), or how to assist students to dealing with them (International Education Advisory Council, 2013). The 'student experience' is a term frequently associated with international students' experience of these issues during adjustment, with the assumption that if issues are dealt with and needs are met a positive student experience is possible. Documenting and classifying these concepts has occurred across many studies, and Table 5 provides a summary of concepts from five different studies.

- **Difficulties:** A study of the international student coping strategies, revealing themes relating to the difficulties that international students experience (Khawaja & Stallman, 2011).
- **Stressors:** A study of the acculturation experiences of international students which reviewed the main topics associated with acculturative stress (Smith & Khawaja, 2011).

- **Needs:** A study investigating the needs that international students experience during adjustment (Poyrazli & Grahame, 2007).
- **Positive Experience:** Advice from the International Education Advisory Council (IEAC) to the Australian Government, which reviewed topics associated with a positive student experience (International Education Advisory Council, 2013).
- **Negative Experience:** A strategy paper released by the Committee for Melbourne that reviewed factors reported by international students, which they reported as having a negative influence on their experience studying in Melbourne city (Committee for Melbourne, 2015).

Difficulties	Stressors	Needs	Positive experience	Negative experience
Adjustment	Language	Orientation	Wellbeing	Accommodation
Social isolation	Education issues	Transportation	Costs: tuition and living	Transportation
English language skills	Socio-cultural issues	Communication	Access to support	Cultural interaction and engagement
Studies	Discrimination	Accommodation	International integration on campus and in community	Health care
Unmet expectations		Social Interaction	Affordable and safe accommodation	A safe, welcoming and inclusive environment
Culture shock		Academic life	Work integrated learning	Communication
Seeking employment		Financial	Diversity – integration of international and domestic students	
		Health care		
		Counselling		
		Discrimination		

Table 5: Summary of concepts relating to issues experienced during adjustment from five different studies.

Addressing the issues and needs experienced by international students is often a high priority, for institutions and researchers interested in improving the experience and adjustment outcomes for international students.

Institutions often address the challenge of providing support to international students through orientation programs and interventions designed to provide general information and help

international students adjust, develop social ties and gain cultural orientation. In recognition of the support friendships provide, particularly those with host-nationals' orientation programs and interventions often emphasize the mingling of students from diverse backgrounds and exposure to the wider community. Anecdotal evidence suggests that such initiatives are effective but the success of such programs is difficult to measure, and the consequences or positive effects if any on participants are not guaranteed to emerge (Lawson, 2012; Sakurai, McCall-Wolf, & Kashima, 2010).

Empirical research often looks at how individuals respond when issues and needs arise. Understanding behaviours like information seeking can help institutions improve the provision of support and availability of information in response to issues or needs experienced by international students in new environments. For example, Lu et al. (2007) studied the factors that may predict international students use of the internet to seek disaster related information, the study looked at variables including internet self-efficacy, dependency and attitude towards seeking information online. Results showed that dependency was significantly related to the likelihood that an international student would use the internet to seek information during a disaster, and that high levels of internet use are positively associate with the internet ranking highly as an information source. Another study by Oh & Butler (2015) investigated how domestic and international students at the University of Maryland seek geospatial information in an unfamiliar environment. The study looked at the perceived importance and use of geospatial information sources during the adjustment experience. Results showed differences between geo-national groups with some differences among gender and program levels.

Both studies collected responses from individuals through the use of survey questionnaires. These kinds of empirical approaches often focus on problem specific information seeking behaviour in response to issues and needs, in contrast general everyday information behaviour of international students is not well understood, particularly in life outside of work and university life. But some research has focused on Everyday Life Information Seeking (ELIS), and information seeking practice of international students.

A study by Sin & Kim (2013) investigated the instrumental information value of social networking sites (SNS) in the ELIS of international students at an American public university. The study looked at the relationship between information behaviour and

individual characteristics including age, gender, level of study and personality using a questionnaire. Results showed that SNS use was related to age, and that SNS were perceived as useful for more than just social capital maintenance by international students. Every day information was also seen as important, particularly financial information, health and news from home.

Studies which have looked at the practices of migrants more broadly are also relevant. A study by Komito & Bates (2011) described the practices of Polish and Filipino migrants in Ireland using electronic modes of communication to maintain contact with distant friends and relations. Results from analysis of interviews with migrants show that new technologies enable migrants to maintain trans-national social ties using a variety of technologies. This enhances their mobility, and allows them to remain connected to distant communities and collectives.

2.3. The adjustment process

This part of Chapters 2 describes four key concepts related to the adjustment process experienced by migrants during time spent in a host country. Section 2.3.1 presents the theory of acculturation. Section 2.3.2 presents the concept of social support. Section 2.3.3 presents the concepts of social inclusion and exclusion, and Section 2.3.4 presents the concept of settlement as distinct from acculturation.

2.3.1. The acculturation experience

This section presents the concept of acculturation and associated theoretical concepts. Acculturation can best be described as the process of adaptation (or change) that occurs when groups of individuals having different cultures come into contact (Berry 1997). It is formally defined as 'the change that occurs as the result of sustained first hand contact between individuals of differing cultural origins' (Ward et al., 2001, p. 43). Ideally the process of acculturation leads to cohesion or integration of the individual within a host society, but it also helps to explain what happens when things go wrong, for instance when an individual experiences the phenomenon known as culture shock. But use of the term has shifted from one which implies that a person is a passive victim suffering some form of trauma to one which implies a proactive response by a person to resolve problems stemming from life change, contact-induced stress or skill deficits. In this way the terms of adaptation and

acculturation have come to replace culture shock when describing the experience of migrants and other cultural travellers (Zhou et al., 2008).

Here the term acculturation shall be used to describe the process of adjustment leading to adaptation. Adaptation rather than integration is the outcome of acculturation and is composed of both psychological and socio-cultural adaptations (Ward et al., 2001, p. 42). The study of the change that occurs when individuals who have developed in one culture live in a new cultural context provides insight into the experience and behaviour of migrant groups such as international students. Adaptation outcomes are both psychological and socio-cultural; psychological outcomes relate to affective responses including well-being and self-esteem, and socio-cultural outcomes relate to behavioural responses linking a person to the host society (Smith & Khawaja, 2011).

The Acculturation Process

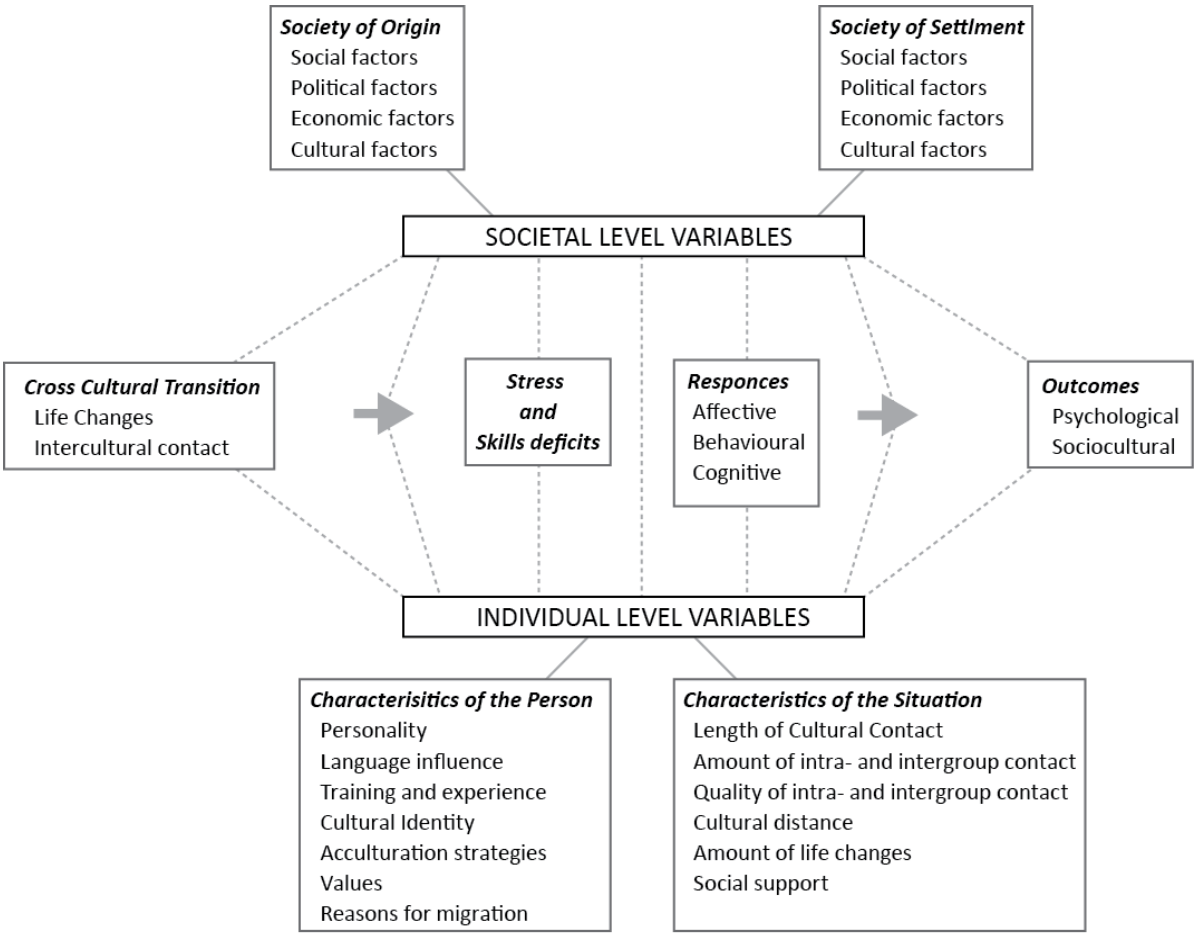


Figure 2: The acculturation process (Ward et al., 2001, p. 44).

To capture the diverse approaches towards the study of acculturation (intercultural contact and change), Ward et al. (2001) propose an integrated model of acculturation theories reproduced here in Figure 2. The model draws on a concept from psychology known as the ABCs or the Affective, Behaviour and Cognitions of human interactions that includes distinctions for both individual and group level analysis.

- **Cultural learning theory:** The process by which 'sojourners acquire culturally relevant social knowledge and skills in order to survive and thrive in their new society' (Ward et al., 2001, p. 51). Cultural learning focuses on behavioural aspects of intercultural contact, with the assumption that the distress that travellers experience is due to a lack of social and behavioural skills in the host society, which creates barriers to adjustment (Ward et al., 2001).
- **Stress, coping and adjustment:** The stress and coping approach focuses on the appraisal of life changes by an individual and their selection and implementation of coping strategies to deal with change. The process treats the acculturative experience similarly to other transitional experiences, thus general stress and coping factors are used like personality and social support along with ones specific to acculturation, such as cultural distance, strategies specific to acculturation and status (Ward et al., 2001).
- **Social identification theories:** Social identification draws on theories of social cognition that 'deal with the ways in which people perceive and think about themselves and others, including how they process information about their own group (in-group) and about other groups (out-groups)' (Ward et al., 2001, p. 98). Theories include general forms of Social Identification Theory (Phinney, Horenczyk, Liebkind, & Vedder, 2001) along with models and measurements specific to acculturation (Ward et al., 2001).

The phenomenon of acculturation occurs at both an individual and a group level. Understanding group level experiences can provide an understanding of acculturation trajectories and help link social factors (Cabassa, 2003). Understanding an individual's experience through the Affective, Behavioural and Cognitive changes – the ABCs of acculturation can help predict and understand social and psychological outcomes, for instance the positive outcome of social cohesion for an individual in a group or the negative outcome of culture shock or marginalisation (Ward et al., 2001). Social psychological approaches

towards acculturation at an individual level are the dominant approach towards understanding this process of cultural change but a narrow focus may limit the range of factors under consideration, missing essential qualities of the multidimensional process, even to the extent that culture is overlooked (Chirkov, 2009).

Alternatively, Chirkov (2009) proposed a critical psychology of acculturation. They argued that these logic-deductive psychological approaches towards the study of acculturation are too fixated on assessment and prediction of acculturation outcomes, and that in so doing do not provide an understanding of the process of acculturation, or provide adequate consideration of the cultural component of acculturation. They call for research that is culturally sensitive, and that focuses on the experiences of migrants during the acculturation process. The interactions between migrants and people in the host society to understand factors, including their negotiation of their old and new identities, to understand the meanings that migrants construct to function in the host society (Chirkov, 2009). In this vein the socio-cultural nature of acculturation may be emphasised over the more traditional cultural psychological conceptualisation.

The majority of studies focus on behavioural acculturation, but the concept is actually a multidimensional one, which may also include other constructs including cultural practices, values and identifications (Schwartz & Unger, 2013). Multidimensional approaches towards acculturation are less common. Schwartz & Unger (2013) presents a multidimensional approach which brings together the concepts of practices, values and identifications that inform acculturation. Schwartz & Unger peak of cultural practices, cultural values and cultural identifications as the major components of acculturation, in addition to behaviour which is the main focus of acculturation scholarship (Schwartz & Unger, 2013).

Context is also important in acculturation. An unfavourable context of reception might include discrimination, lack of access to jobs or social resources, or being marginalised. This is related to acculturative stress, and outcomes of the acculturation process (Schwartz & Unger, 2013).Context is also a critical component of acculturation; factors at both an individual and situational level prior to immigration, during immigration and in the settlement context will directly impact the adjustment of an individual to a new culture (Cabassa, 2003). According to the general framework of contextual factors proposed by Cabassa (2003), the model of the acculturation described by Ward et al. (2001) and an

updated model proposed by Zhou et al. (2008), factors include individual factors like values, cultural identity and acculturation strategies, situational factors like social support, or time in the new culture and societal level factors like the social, political, economic and cultural environment.

Another issue identified with acculturation is that it may vary depending on the type of migration, for instance voluntary or involuntary migration and other factors associated with a particular group of migrants (Schwartz & Unger, 2013). As a result, most models are general and not specifically designed for any particular group. This is an issue raised by Smith & Khawaja (2011) in relation to the acculturation of international students and in many cases the degree to which existing models fit a particular group is important to evaluate (Smith & Khawaja, 2011).

2.3.2. Social support

This section presents the concept of social support and provides a definition that instantiated the concept in its own right. The concept of social support appears throughout the adjustment literature, and often in association with other concepts such as social integration, social cohesion and social capital.

The importance of friends and social ties (or bonds) is consistently recognised in the acculturation process. For instance, an international student's social network is understood to play an important role in supporting and sustaining them while studying overseas. These connections are likely to exist prior to a student embarking on their journey and can influence their decision to study overseas, their choices of what to study and where. Through these social networks international students can acquire information about jobs, food and shelter, explore their new surroundings, remain in touch with cultural practices and overcome many of the daily challenges they may be confronted with.

Having access to friends as a source of social support helps international students cope with the cultural adjustment process and contributes to their emotional well-being. The social support friends provide is multidimensional in nature and can consist of emotional, instrumental, informational and environmental support. It is known that international students are most likely to make friends with other co-nationals out of a need for easy communication in their native language, maintaining their cultural identity and access to practical

(instrumental) support. These students are then unlikely to make friends with host-nationals who can provide a significantly better support through their local knowledge and experience.

Acculturation models of adaptation show that international student adjustment is intricately tied to the social relationships of these students and that the support they can potentially and actually derive from them is significant. This relational approach is sometimes formally described as a social network perspective, which can also be followed to investigate related network properties and social support of international students. A social network perspective focuses on network properties, explaining their causes and consequences for the individual and society. The four concepts mentioned earlier are derived from this perspective, the concepts of social cohesion, social integration, social capital and social support (Song, Son, & Lin, 2011).

2.3.3. Social exclusion and inclusion

This section presents the concepts of social exclusion and social inclusion. The concept of social exclusion is premised on the objective of social cohesion, a sense of collective identity shared by members of a society (social norms for instance) at varying levels, including community, regional and national levels (Sen, 2000; Song et al., 2011).

Social exclusion is a multidimensional concept with economic, cultural, social and political dimensions emphasising the multiple ways in which exclusion may occur. Exclusion is viewed as a process and the concept of exclusion is connected with the notion of deprivation and poverty. The concept of deprivation may be viewed as 'the inability [of a person] to do things that [they have] reason to want to do' (Sen, 2000, p. 6) and here the definition of poverty is viewed as a capability deprivation where an individual experiences a 'lack of the capability to live a minimally decent life' (Sen, 2000, p. 4). Exclusion does not always result in a person experiencing poverty. The nature of the process leading to exclusion is important when determining the relevance of the concept and its application, and social exclusion can be defined as relational capability deprivation that leads to individuals being unable to do things that they may have reason to want to do, such as participate in the host society (Sen, 2000)

Social inclusion is treated as the solution to exclusion and usually consists of policy and strategies to prevent social exclusion. Approaches towards social inclusion vary between nation states and are influenced by political and ideological positions held by governments,

organisations and individuals. For instance, outcomes such as well-being, self-esteem, and access to social-power may be valued more highly than social cohesion, employment or reducing poverty levels in an agenda seeking to achieve the objectives of social cohesion and cultural/ethnic diversity where diverse identities are valued (Caidi & Allard, 2005).

One approach to social inclusion is to treat it as an information problem. Caidi and Allard (2005) identify information as an important component of social inclusion. They posit that part of the challenge presented by the problem of social exclusion is down to a lack of information in forms understandable and usable by migrants during their settlement in a host society. The idea that a lack of information contributes to exclusion arises from literature on the concepts of the digital divide and the associated concept of information poverty (Haider & Bawden, 2007).

2.3.4. Settlement

This section presents the concept of settlement. Intertwined with the concepts of acculturation, adjustment and adaptation is the process of settlement. This is a broader concept than that of acculturation and can be understood as a process with stages variously associated with specific needs and attitudes towards resources, institutions, or technologies (Caidi & Allard, 2005). Similar to the concept of acculturation the concept of settlement recognises that a migrant will have a range of pressing needs upon arrival, and that these needs will develop as the migrant finds their place in the host society and adapts to new life circumstances. As migrants adapt, needs become more diverse and individual, but learning to overcome systematic barriers to participation is a common process that all migrants must engage in.

In a study of newcomers to Canada, Mwarigha applies the concept of settlement to understand their information needs in the process of settlement. Mwarigha finds that for newcomers this experience results in needs for information and support that can be grouped into a series of stages (Mwarigha, 2004, pp. 9–10):

- On arrival: A newcomer may experience immediate needs for assistance, and reception services such as food, clothing, shelter, language services and orientation.
- In the short term: access to systems and institutions, access to work, housing, health services, legal services and further language instruction may be important.

- In the long term: equal participation in economic, cultural, social and political life are significant as the newcomer settles into society.

For a newcomer finding information during settlement is an important factor of their smooth transition and inclusion into the host society (Caidi & Allard, 2005). For the host society the heterogeneous nature of newcomers and the circumstances under which they arrive may challenge the provision of information and support services that are required to aid the settlement of newcomers at different stages of their settlement. The concepts of settlement and acculturation are often used interchangeably in studies of the international student experience. The distinguishing feature between settlement and acculturation is the level at which each concept is applied; acculturation is usually an individual micro level concept, while settlement is closer to a meso-macro level observing both the adjustment of individuals intertwined with broader social institutions of government, media and the state. The process of settlement or 'settling in' does pose its own challenges for both the host society and newcomers.

2.4. The modern migrant

This part of Chapter 2 presents concepts relevant to the 'modern migrant', a term used in this thesis to describe individuals who traverse both traditional and modern paradigms of human migration. The underpinning issues are presented in three sections. Section 2.4.1 presents the concept of mobility and the mobility paradigm. Section 2.4.2 presents the differences between the concepts of adoption and appropriation of ICTs and section 2.4.3 presents a comparison of mobile phone use statistics between the USA and Australia.

2.4.1. The mobility paradigm

This section presents the mobility paradigm. The increased adoption and appropriation of ICTs by people in their everyday lives has led ICTs to having a profound effect on human communication and travel. ICTs are changing human behaviour and are challenging previously held understandings of social phenomena such as human migration. The mobility paradigm proposed by John Urry is premised on the observation that personal communication mediums are more prevalent than they ever have been and providing new 'social affordances' – the opportunities and constraints that ICTs and social systems provided for each another. Their transformation of personal communication technoscapes is changing patterns of social bond construction and relational behaviour between human beings. The abundance of

communication technology is allowing new kinds of relational behaviour to emerge (Sheller & Urry, 2006).

In this way ICTs have also had an impact on people's activity and travel behaviour. Many activities no longer need to be performed at certain places or times as they have been in the past. Limitations on people's mobility are relaxing and more flexible arrangements are now feasible. Mobile communications are increasing the spatial and temporal flexibility of people's lives. Smart phones are changing how people can coordinate their daily activities and organise travel plans. Plans and schedules no longer need to be fixed or finite, as continuous access allows them to be easily adapted and renegotiated to respond to changing circumstances or situations as they present themselves.

Licoppe (2004) speaks of the 'connected relationship', where an absent (distant) person may maintain a relationship by utilising their technoscape in a continuous pattern of mediated interactions, achieving a 'connected presence'. The concept describes the role of a phone – be it the domestic telephone or mobile phone, and how relationships are maintained using this device. Licoppe shows that two modes of communication are important when it comes to maintaining connected relationships. The first is a conversation that is long, and potentially ritualised, the time taken to converse is a sign of the strength of a social bond. The second is short and frequent communicative gestures – these includes voice of textural communication. Contact as the content of communication must indicate the strength of a relationship and the connection maintained. The use of mobile phones and their forms of communication (such as electronic messages) are theorised to correspond to the mode of connectedness. This phenomenon occurs at all three levels: the *miso* level where it relates to interpersonal interactions, the *meso* level of social relationships and the *macro* scale dealing with social networks and communication fluxes.

Emerging from the mobility paradigm and concepts like connected relationships is the epistemology of the 'connected migrant'. The concept defines the modern migrant through their mobility and connectivity rather than simply the displacement and rupture they may experience. It seeks to correct the historical simplification of the migrant as a socially uprooted and culturally displaced individual. The connected migrant remains in touch with relations while on the move, they integrate rather than assimilate with host societies. Rather than breaking social and cultural bonds they are able maintain connection with their home

country. The use of modern media allows migrants, including international students, to easily remain in touch with their friends, family and communities while abroad. A range of technologies will often be employed in strategies by migrants to maintain connections while abroad and to establish new ones (Diminescu, 2008).

2.4.2. The difference between adoption and appropriation

This section presents the concepts of ICT adoption and appropriation. Models of adoption capture the process leading to an individual's decision to use ICT (Horts, Besseyre, Isaac, & Aurélie, 2006). Many models exist for ICT adoption: the Technology Acceptance Model (TAM) aims to understand the users' perceptions of adopting ICT innovation (Davis, 1989); another is the Theory of the Diffusion of Innovation (TDI) – the theory is applied in information systems the determinants of ICT adoption within organisations (Rogers, 2010). More recently the United Theory of Acceptance and Use of Technology (UTAUT) has also emerged (Venkatesh, Morris, Davis, & Davis, 2007). Appropriation is 'the process by which individuals incorporate ICT in their daily practices' (Codagnone 2011, p. 14). Models of appropriation can be said to represent the technical and cognitive mastery of ICT underpinned by a social constructionist perspective (Horts et al., 2006). Adaptive Structuration Theory (AST) is a model that describes 'the interplay between advanced information technologies, social structures, and human interaction' (DeSanctis & Poole, 1994, p. 125) and the model is underpinned by structuration theory.

Due to the similarities between models of adoption and appropriation, joint models have also been proposed which argue that adoption and appropriation are part of the same process (Horts et al., 2006). Models have also been developed which accommodate specific ICTs. For instance, a model of mobile phone appropriation has been developed (Karim & Oyefolahan, 2009), and models that describe the process of phone appropriation (Wirth, Von Pape, & Karnowski, 2008). Models have also been developed to describe the adoption and use of a mobile phone (Carroll, Howard, Peck, & Murphy, 2003).

2.4.3. The mobile phone

This section presents statistics relating to mobile phone use and a comparison between the United State of America (USA) and Australia. In the USA, the PEW Research Centre estimated that in 2015 nearly two-thirds of Americans owned a smartphone (Pew Research Center, 2015) and that since 2013 over 90% of Americans owned a mobile phone (also

known as a cell phone) (Duggan, 2013). In Australia the situation is very similar, the Australian Communications and Media Authority (ACMA) estimated that in 2014–15, 93% of adults living in Australia were using a mobile phone and that, of those, 74% were estimated to be using a smartphone. The report suggests that mobile phone ownership has reached saturation point, and people are mostly replacing existing phones with smartphones rather than purchasing a phone for the first time (ACMA, 2015).

It is not a new or particularly controversial assertion to say that mobile phones have become Omni-present in everyday life (Goggin, 2006) or that the mobile phone is reconfiguring everyday life across space and time (Ling & Campbell, 2010). Over the last decade a vast amount of research has emerged, placing technologies including the internet and mobile phones at the centre of everyday life and human social behaviour (Goggin, 2006; Katz & Aakhus, 2002; Ling, 2008; Ling & Campbell, 2011). It is also argued that there is such a thing as mobile phone culture, and the study of mobile phone culture has emerged as a field of research in its own right (Goggin, 2006; Horst & Miller, 2006; Ling, 2008).

2.5. Everyday life information seeking

This part of Chapter 2 presents concepts relevant to everyday life information seeking. Today there are a plethora of theories on Human Information Behaviour (HIB), this is most clearly illustrated in the book Theories of Information Behaviour (2005) by Karen Fisher, which catalogues over seventy distinct theories currently in use by HIB researchers. While many HIB authors focus on behaviour as procedure (process/cognitive), Savolainen is responsible for putting a focus on information in people's everyday lives. Savolainen provides a definition for Everyday Life Information Seeking (ELIS) (Savolainen, 1995), and a model of Everyday Information Practice (Savolainen, 2008). These concepts will be presented in four sections. Section 2.5.1 presents the theory of ELIS. Section 2.5.2 presents the theory of Everyday Information Practices. Section 2.5.3 presents the practice approach and section 2.5.4 presents the Information Source Horizon.

2.5.1. Everyday life information seeking

This section presents the model of ELIS and the accompanying theory 'way of life' that were first published by Reijo Savolainen in 1995. According to Savolainen (1995) ELIS is understood to be the habitual monitoring of everyday life events related to work activities such as hobbies or other topics of interest. Monitoring takes place through the practice of

seeking orientation information, which can be described as 'information concerning current events' (Savolainen, 1995, p. 272). There are two distinct dimensions of ELIS: the *seeking of orienting information* – that is the habitual monitoring of current events; and the *seeking of practical information* – which occurs when specific problems arise. But the boundaries between these two modes of information seeking are ambiguous (Savolainen, 1995, pp. 272–273).

To Savolainen, 'way of life' refers to the 'order of things' based on the choices individuals make every day. 'Things' stand for the various activities taking place and 'order' describes the preferences given to them. Order is both subjectively influenced by preference and objectively influenced by factors such as length of an individual's working day. The theory of ELIS and 'way of life' are informed by the theoretical framework of habitus by Pierre Bourdieu (Bourdieu, 1984), which describes a system of socially and culturally determined dispositions internalised by an individual. The concept of habitus provides a means of conceptualising the natural place of practices in everyday life and how it is organised.

Often the order of things is well established and an individual will view their way of life as normal or the most natural way of doing things. They will have a perception of how things are when they are 'normal'. As such, the order of things may not always wholly be in accordance with one's wishes and to keep things in a meaningful order individuals are required to take active care of it. This life management if referred to as 'mastery of life' and it may be either passive or active. The requirement for a positive mastery of life is a sense of coherence; when everything goes as expected management will be passive, if the order of things is disturbed or threatened then active problem solving may occur to restore order. (Savolainen, 1995, pp. 263–64). An individual's culture and social class form the basic models of one's mastery of life, which concerns the typical ways of approaching everyday problems that direct habits and attitudes towards the order of things. These models influence the development of practices established to maintain the order of things. Habits of information seeking form part of the mastery of life.

2.5.2. Everyday information practices

This section presents the model of Everyday Information Practices. Savolainen's model of Everyday Information Practice, displayed in Figure 3, evolved from the original concept of ELIS (Savolainen, 1995). It expands on the original model in a number of significant ways,

preferring the concept of life *projects* (Hektor, 2001) over habitus, practice (Schatzki, 2005b) over behaviour or action, and draws heavily on the phenomenology of Alfred Shultz (T. D. Wilson & Savolainen, 2013).

The concept of an *everyday project* is introduced by Savolainen in Everyday Information Practice; adopted from the work of Anders Hektor (2001), it replaces the use of habitus as a means of describing the context of an individual's information practice. According to Hektor (2001) a project is understood to be an objective of an individual that is possible to label and that constitutes a domain where the carrying out of a (vague) plan imparts 'problematic situations'. These problems appear as a series of activities that are related but spread over the course of everyday life. Projects form the contexts within which people experience the phenomena of Everyday Information Practices and there are two main types of projects defined by Hektor (2001, p.75):

- The *generic project* which describes pursuits that are common to all members of an environment (society or a community).
- The *specific project* concerns only those projects that are found in a particular life situation or that carry some special interest. These may have different forms such as *Change-projects* that manage transitions in life (such as changing job, moving house) or *Pursuit-projects* that are continually present projects for furthering a general interest (raising a child).

The practice theory of Schatzki (2005a) informs the practice approach towards information practices of seeking, use and sharing. An information practice comprises specific information actions, such as identifying sources in the context of seeking or judging their value in the context of use. The concept of an information horizon is constitutive of practice, orienting the ways in which sources and channels are preferred and accessed (selected) in information seeking; information use is oriented by how sources are valued and information sharing by actions of giving and receiving (pp. 64–65). Practices draw on an individual's stock of knowledge which guides how they proceed (to action). Actions are determined by characteristics of an individual's socio-cultural context such as rules or norms.

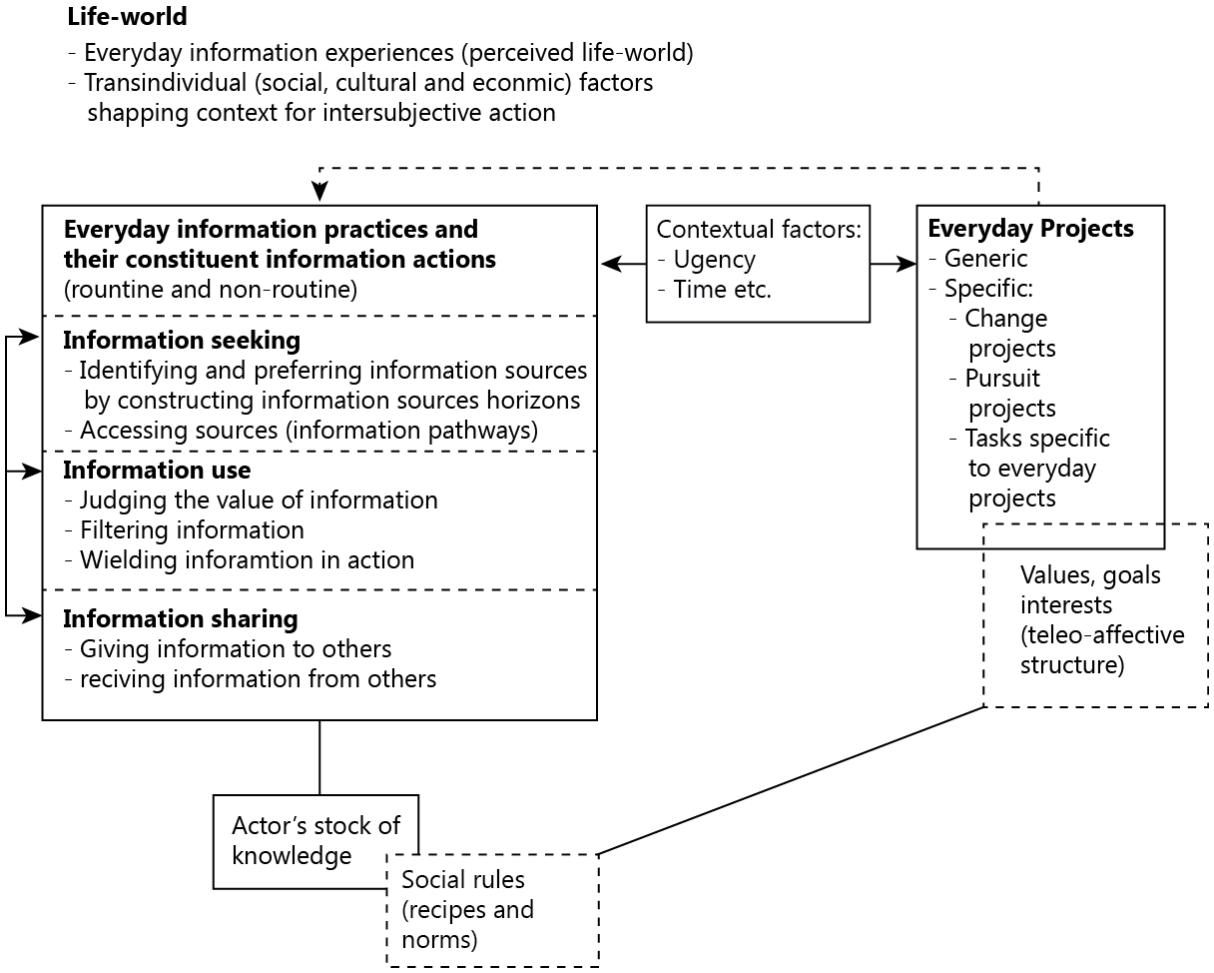


Figure 3: Model of Everyday Information Practices (Savolainen, 2008, p. 65)

Research on information practice focuses on the task of finding 'the ways in which people who accomplish everyday information practices construct them as meaningful' (Savolainen, 2008, p. 5), and an investigation seeks to understand how practices are possible, drawing on the justifications through methods that capture the individual experience. This approach is distinct from other approaches where the frequency of source or channel use are counted as a measure of importance or where outcomes such as usefulness for achieving a particular objective (or fulfilling a need) are sought (Agarwal, 2011).

2.5.3. The practice approach

This section presents an overview of Practice Theory and the practice approach to research what forms the foundations for the theory of Everyday Information Practices. It has emerged as a means of moving beyond problematic dualisms and ways of thinking, for instance the

humanist dichotomies between human and nonhuman entities. In this context use of the term 'theory' refers to general or abstract accounts of practices or the field of practices. The field of practice encompasses diverse accounts of phenomena to form a total nexus of 'interconnected human practices' (Schatzki, 2005b). According to Schatzki (2005b) the practice approach includes all analysis that:

1. *Develops an account of practices, either the field of practices or some subdomain thereof, or*
2. *Treats the field of practices as the place to study the nature and transformation of their subject matter* (Schatzki, 2005b, p. 11).

In this way practices may be defined as 'embodied, materially mediated arrays of human activity centrally organised around shed practical understanding' (Schatzki, 2005b, p. 11). Practices form the immediate context within which the 'preponderance of bodily properties crucial to social life are formed, not just skills and activities but bodily experiences, surface presentations, and even physical structures' (Schatzki, 2005b, p. 11). Actions are embedded in practices, and human activity is understood to depend on shared skills or understandings that are embodied, and activities may be entertained with nonhuman entities that both shape and that are shaped by practices. The social may then be thought of as a field of embodied, materially interwoven practices centrally organised around shared practical understandings, a definition that challenges the privilege position of the individual. In this practice approach nonhumans mediate practices, and in some conceptualisations may themselves even propagate practices if practices comprise human and nonhuman activities.

In a practice approach 'the social' is treated as a nexus of activity, phenomena determine social order by affecting the actions that produce them (i.e. cause, constrain, or form), thus organising the contexts of human action or by directly determining order at a macro or meso level independent of human activity. For instance, through macro institutions which determine the actions and interactions within them.

To Schatzki (2005a), social order is established in a nexus of interwoven practices; social orders 'are arrangements of people and of the artefacts, organisms, and things through which they coexist, in which these entities relate and possess identity and meaning' (p. 61). Arrangements are determined within and across practices, an arrangement being a layout of

entities in which they relate and take up places with respect to one another. On the basis of this intuitive conception, social order can be defined as arrangements of (entities) people and the organisms, artefacts, and things through which they coexist.

Entities relate in four dimensions: spatially, causally, intentionally (via mental states), and prefigurationally (by containing and enabling their actions). Entities poses identities or meanings as elements of an arrangement through their relations to other entities. Ties social order to identity and meaning, people poses identities and things (human or non-human) bear meanings as elements of arrangements. Meaning and identity constitute 'being', which in this approach is central to order, social order is instituted with practices. The context in which arrangements exist is also important here, it is where activity and practices occur.

To Schatzki 'social orders are established within the sway of social practices because practices mold the forms of determination that are responsible for them' (Schatzki, 2005a, pp. 54–55). Schatzki proposes two types of determination, practical intelligibility 'the bringing about of something that bears a particular meaning' (ibid, p. 54) and the institution of meaning 'the establishment of the fact that it bears that meaning' (ibid, p. 55). Accordingly, a practice is 'a set of actions' constituted by doings and sayings (Schatzki, 2005a). Doings and sayings are organised mentally 'by a pool of understandings, a set of rules and ... a teleoaffective structure' (Schatzki, 2005a, p. 57). But the mind does not cause behaviour, the mind is a 'medium' through which practices are organised; it 'instead consists in practical intelligibility-determining states of affairs that are expressed in behavior' (ibid, p. 58). States of affairs or mental states (i.e. to desire, hope, believe, etc.) are expressed in behaviour which signifies them; i.e. anger is manifest in violence, 'states inform behaviour by determining what makes sense to people to do' (ibid, p. 57).

The understandings that link the actions composing a practice can be described as 'abilities that pertain to those actions' (Schatzki, 2005a, p. 59) such as 'knowing how to' perform, identify, instigate or respond to action(s) through the doings and sayings available in current circumstances. In this way understandings may determine what makes sense to people to do. But practical intelligibility is primarily determined by rules, teleology and affectivity – the teleoaffective structure (Schatzki, 2005a).

Rules are explicit formulations like normative enjoinings, laws or ‘rules of thumb’; these will intermittently determine what people specifically do. Teleology is ‘orientation towards ends’ and affectivity is ‘how things matter’, and practical intelligibility is teleologically and affectively determined – a mental determination. A teleoaffective structure specifies arrangements of acceptable or correct ends, i.e. tasks, beliefs etc. for the sake of the ends – it is a normative structure (Schatzki, 2005a). For example, in the theory of Everyday Information Practices values, goals and interests inform the teleoaffective structure of information seekers (Savolainen, 2008, p. 28).

2.5.4. Information source horizons

This section presents the concept of the information horizon. An information horizon is both a model and technique for understanding where information sources and channels fit into the information seeking process. The concept of an information horizon was originally developed by Sonnenwald (1999) as a means for holistically capturing the information sources that a person chooses to seek information from.

The concept of an information horizon was first introduced by Sonnenwald (1999) in what they termed an evolving framework of human information behaviour. They proposed that ‘within a context and situation is an “information horizon” in which we can act’ (p. 8). This information horizon consists of information resources that are ‘determined socially and individually for situations and contexts’ (p. 8). Horizons are shaped by the individual, but sources may also be aware of other sources and the individual and may act, for instance by providing recommendations based on the perception of an information need or lack of knowledge (Sonnenwald, 1999). The concept was tested in a study examining people’s ability to describe their information horizons both graphically and verbally, resulting in the creation of information source horizon maps (Sonnenwald, Wildemuth, & Harmon, 2001).

The concept of an information source horizon was later adapted by Savolainen & Kari (2004) to understand the information source preferences of individuals in their everyday life information practices (Savolainen & Kari, 2004). In Savolainen’s work an information source horizon is treated as spatial metaphor defined as: 'an imaginary field which opens before the "minds eyes" of the [individual]. An [individual] may position information sources in this field so that sources deemed most significant are placed nearest to the [individual], the less significant ones further on, and the least central ones closest to the horizon line...' (Savolainen

& Kari, 2004, p. 418). An individual will construct their Information Source Horizon (ISH) using sources drawn from their perceived information environment that generally contains all the sources and channels accessible to them in their everyday lives. An individual judges the relevance our information sources available in the information environment and selects a relevant set of sources. In Savolainen's definition the individual is also considered a source of information, and should reflect on their place within that space when constructing their horizon. An individual is generally considered to be at the centre of their horizon, representing the position and importance of their stock of knowledge (Savolainen & Kari, 2004).

Information Source Horizons form part of a broader context – a perceived information environment. The perceived information environment contains the complete set of information sources and channels available to the information seeker generally. An ISH contains a subset of these information sources and channels relevant to the situation at hand. The general nature of value judgments between situations depends on how general or specific the situation (and information need) is (Savolainen & Kari, 2004, p. 419). The perceived information environment changes slowly, as it represents a general picture of the sources and channels available to a person. An ISH may be stable, indicating the ways in which a person tends to value sources and channels across situations, or dynamic if the ISH is a problem or situation specific horizon (Savolainen, 2008).

Regions of relevance

A person constructs their ISH by drawing on diverse preference criteria which are defined by the perceived relevance of every day interests (or issues).

Since everyday information practices are 'strongly directed by an individual's interests that structure their life world into regional of decreasing relevance' (Savolainen, 2008, p. 59), the concept of regions of decreasing relevance may be used to interpret information source and channel preferences in relation to interests and everyday information practice. Regions of relevance provide a means of understanding the relevance of everyday interests and issues, 'objects in the everyday world capture a person's attention through [their] interests' (Savolainen 2008, p. 90).

The metaphor of regions of decreasing relevance assumes that a person is not interested in all provinces of their life world equally. A person will devote more attention to everyday affairs

than events occurring beyond them. The concept described by Savolainen (Savolainen, 2008) proposes three major regions of relevance, drawn from the 'spatial arrangement of the everyday life world' presented by Schutz and Luckmann (1974, p. 37). The regions of decreasing relevance are: the region of primary relevance, the region of secondary relevance and regions of periphery relevance.

The region of primary relevance stands for 'the world within actual reach', it specifies part of the life world that is 'at hand' and where actions serving the needs of projects primarily take place. This region is arranged spatially and temporally with the actor at the centre 'here' (Savolainen, 2008).

The place in which a person finds themselves is referred to as 'here'; it defines the starting point from which the person orients themselves to objects through distances and perspectives. A field that surrounds them, a person classifies objects into relative categories, in front, behind, near or far etc. (Schutz & Luckmann, 1974).

The region of the life world which is accessible to a person's immediate experience is termed 'the world within actual reach'. This region has a fixed structure and coordinate system, and its orientation or reference point is centred on a person. The relevance of objects in this region is defined by their meaning to the person whose life world it is. The region of primary relevance is subject to constant change, as it moves with the person as they go about their everyday life (Schutz & Luckmann, 1974).

The region of secondary relevance stands for 'the world within potential reach'. It specifies part of the life world where objects of interests that are not directly 'at hand' cannot be mastered but which can be accessed if need be (Savolainen, 2008).

The region just outside of a person's immediate experience is the 'world within potential reach'. This region is both spatial and temporal. Temporally it comprises the 'world within restorable reach' a world which a person has recently left behind but might choose to return to and the 'world within attainable reach', a world that was never in reach but which is familiar and that can be brought within actual reach (Schutz & Luckmann, 1974).

Previous acts and experiences belong to the world within previous reach, retained through a person's consciousness. The world within potential reach is based on past and future states of

consciousness, determined by a person's stock of knowledge that contains their lived experience. A person will draw on their stock of knowledge to plan acts or estimate their ability to attain a certain goal and the region can be further subdivided into levels with various prospects of attainability – determined by spatial, temporal and social distance. Attainability decreases the greater the sublevels' distance is from a person's actual present life world (Schutz & Luckmann, 1974).

Regions of periphery relevance stand for those relatively or absolutely irrelevant regions of the life world with no connection to immediate interests. These regions are taken-for-granted provided that no change affects the regions of primary or secondary relevance.

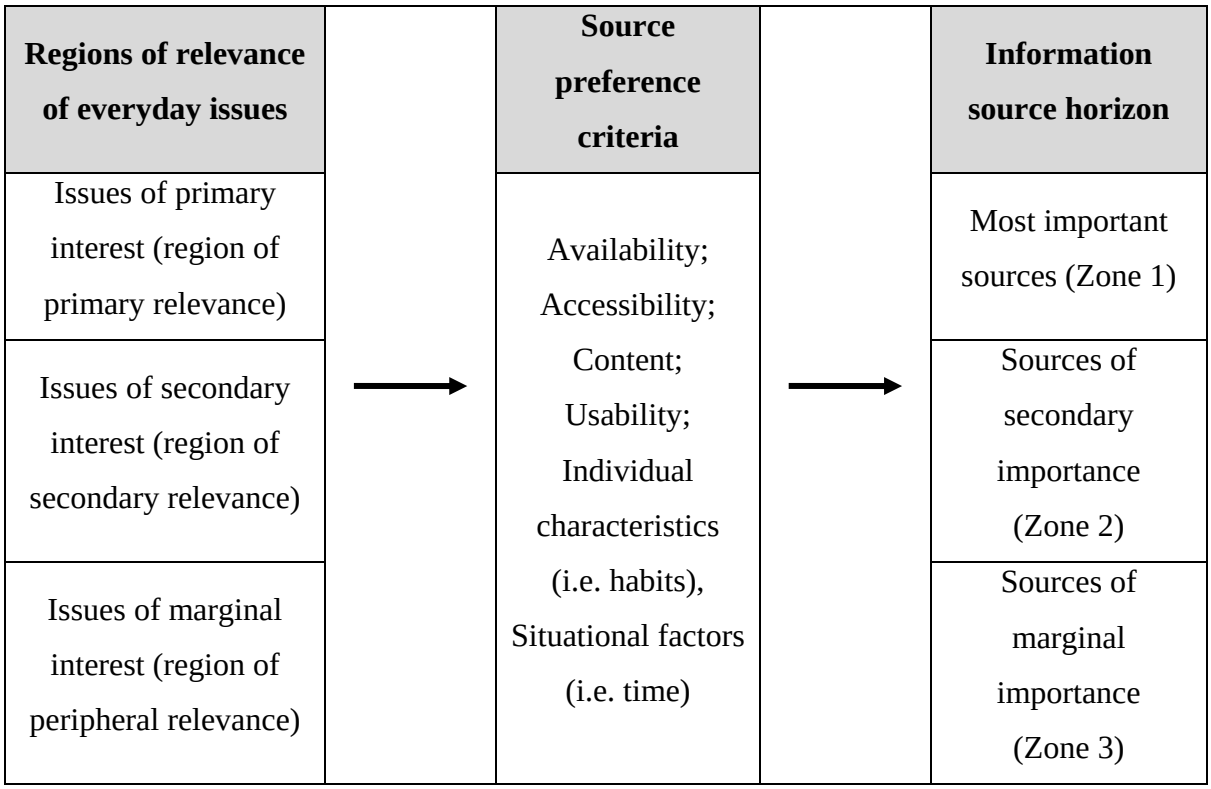


Figure 4: Conceptual framework for understanding Information Source Horizon (ISH) maps (Savolainen, 2008, p. 91).

The relationship between regions of relevance and a person's ISH is represented by the conceptual framework displayed in Figure 4, reproduced from the work of Savolainen (2008, p.91). A person constructs their ISH by drawing on diverse source and channel preference

criteria which are influenced by the regions of relevance of everyday issues. Regions of relevance are in this way related to major zones of importance on a person's ISH:

- The world within our reach – Zone 1: the most important sources
- The world within potential reach – Zone 2: sources of secondary importance
- Periphery regions (Regions 3 and 4) – Zone 3: sources of marginal importance.

The framework infers that a person's interests determine their source and channel preference criteria, which vary depending on the intensity of a particular interest at hand. This is possible since regions of decreasing relevance determine the degree to which information about events and issues are perceived as interesting and thus motivate a person to prefer certain issues of topics to others (Savolainen, 2008, p. 91). Thus by seeing how sources and channels are positioned in a person's ISH, and hearing why from them how they were positioned, the preference criteria by which a person selects and values a source or channel may be captured (Savolainen, 2007). This articulation by a person of their ISH allows the role of certain sources and channels, such as the mobile phone, to be explored in a person's everyday life.

2.6. Summary

This part of Chapter 2 provides a summary of the chapter. Part 2.2 describes the domain of international education, focusing on the Australian context and the international student experience. Part 2.3 presents four concepts relating to the adjustment process, acculturation, social support, social exclusion and inclusions as well as settlement. Part 2.4 presents three topics that relate to the modern migrant: the mobility paradigm, ICT adoption and appropriation, and the mobile phone. Part 2.5 presents four concepts that relate to everyday life information seeking, the theory of Everyday Life Information Seeking (ELIS), the theory of Everyday Information Practices, the practice approach and Information Source Horizons.

3. Methodology

3.1. Introduction

This chapter describes the research methodology followed by this thesis. The chapter addresses four broad levels of research methodology, following Creswell & Clark's (2011) 'four levels for developing a research study', an adaptation of Crotty's (1998) research framework in Figure 5. The framework is appropriate for a thesis which has adopted a mixed methods approach to address the complex nature of the research problem presented in Chapter 1.

1. **Paradigm worldview (**beliefs, e.g. epistemology, ontology)
2. **Theoretical lens** (e.g. feminist, racial, social science theories)
3. **Methodological approach** (e.g. ethnography, experiment, mixed methods)
4. **Methods of data collection** (e.g. interviews, checklists, instruments)

Figure 5: Four levels for developing a research study (Creswell & Clark, 2011, p. 39).

This chapter is presented in four parts. Part two presents the mixed methods methodology. It describes what is meant by the term mixed methods research, how methods may be mixed purposefully, and the process of choosing a mixed methods design. Part three presents the sequential emergent multiphase mixed methods research design adopted by this thesis. Part four presents important topics related to paradigms in research, covering elements of the research paradigm, paradigmatic inconsistencies in mixed methods research, paradigmatic purity, the alternative research paradigm of pragmatism and the dialectic stance. Part five presents approaches to inclusion of theory in research, discussing the role of theory and the purpose of research strategy.

- Part 3.2 presents the mixed methodological approach, covering the topics of what is meant by mixed methods research, purposefully mixing methods and choosing a mixed methods research design.
- Part 3.3 presents the sequential emergent multiphase mixed methods research design adopted by this thesis.

- Part 3.4 presents paradigms in research, covering the topics of elements of the research paradigm, paradigmatic inconsistencies when mixing methods, paradigmatic purity, the alternative paradigm of pragmatism and the dialectic stance.
- Part 3.5 presents inclusion of theory in research, describing the role of theory and research strategy.

3.2. The mixed methods methodological approach

This part of Chapter 3 presents the rationale for a mixed methods methodological approach to address the research problem. Section 3.2.1 describes what is meant by Mixed Methods Research (MMR). Section 3.2.2 presents the process of purposefully mixing methods, and section 3.2.3 presents how to choose a mixed method design and section.

In the 21st century, MMR has emerged as a mature methodological choice, evidenced by the emergences of the Journal of Mixed Methods Research in 2007 and a growing bibliography of essential texts by authors including Creswell & Clark (2011), Teddlie and Tashakkori (2009) and Greene (2007). MMR today offers a viable and comprehensive model of inquiry for researchers in the social and behavioural sciences. The popularity of mixed methods approaches has led to its positioning as the 'third alternative' in research paradigmatic debates (Johnson, Onwuegbuzie, & Turner, 2007).

MMR has emerged as a formalised rejection of the qualitative–quantitative dichotomy that has continued to persist in the social and behavioural sciences (Greene, 2007). Rooted in the historic incompatibility/compatibility thesis debate, the incompatibility thesis underpins the purist stance on mixing paradigms in research (Howe, 1988). The current MMR movement is an attempt to formalise the long standing practice of mixing methods in social and behavioural science research. Mixing methods is not new in research practice and is particularly relevant in the disciplines of education, health and evaluation studies more broadly, where multiple perspectives are drawn on to investigate complex problems (J. C. Greene, Caracelli, & Graham, 1989). But only recently are efforts being made to give this methodological practice theoretical form (Sommer Harrits, 2011).

As with the research methodologies preceding MMR, there are issues which a researcher must be aware of when adopting an MMR approach. Creswell (2011) lists eleven (11) current controversies confronting the mixed methods researcher in Figure 6. His summary provides a

useful overview of the major issues that a researcher may face when conducting MMR. Creswell's controversies provide key points for a discussion of the mixed methods approach, and an informative set of issues which can shape the research process.

Eleven key controversies in Mixed Methods Research
1. The changing and expanding definitions of mixed methods research 2. The questionable use of qualitative and quantitative descriptors 3. Is mixed methods a 'new' approach to research? 4. What drives the interest in mixed methods research? 5. Is the paradigm debate still being discussed? 6. Does mixed methods privilege post-positivism? 7. Is there a fixed discourse in mixed methods? 8. Should mixed methods adopt a bi-lingual language for its terms? 9. Are there too many confusing design possibilities for mixed methods procedures? 10. Is mixed methods research misappropriating designs and procedures from other approaches to research? 11. What value is added by mixed methods beyond the value gained through quantitative and qualitative research?

Figure 6: Eleven key controversies in MMR (Creswell, 2011, p. 270)

The following section shall address the first controversy: '1. The changing and expanding definition of mixed methods research'; it will explain **what** it means to call a piece of research Mixed Method (MM) by discussing three significant definitions of the term. Once a definition for what it means to be MM is established, the question of **why** a researcher might choose to adopt a mixed methods approach, and what purpose this can serve, are addressed.

3.2.1. What is meant by Mixed Methods Research (MMR)?

This section presents an interpretation of what is meant by the term MMR through a review of its definition and application. The practice of mixing methods in research is not new, and many different definitions exist that describe the characteristics which indicate a piece of research constitutes mixed methods. A review by Johnson, Onwuegbuzie & Turner (2007) found that over seventeen (17) definitions existed for MMR, and in reviewing the

characteristics of the definitions, the authors provide a composite definition which in their view best encapsulates the core characteristics of MMR:

> *Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purpose of breadth and depth of understanding and corroboration* (Johnson, Onwuegbuzie, & Turner, 2007, p. 123).

However, according to Creswell's (2011) first controversy '1. The changing and expanding definition of mixed methods research', the issue of whether an approach to research that advocates flexibility, openness and multiplicity needs a ridged definition is still open to debate. In response to this issue, Creswell (2011) has developed a set of core characteristics present in MMR presented in Figure 7.

Creswell's core characteristics of Mixed Methods Research
• Collects and analyses persuasively and rigorously both qualitative and quantitative data (based on research questions); • Mixes (or integrates or links) two forms of data concurrently by combining them (or merging them) or sequentially by having one build on the other, and in a way that gives priority to one or to both; • Uses these procedures in a single study or in multiple phases of a program of study; • Frames these procedures within philosophical worldviews [research paradigms] and a theoretical lens; and • Combines the procedures into specific research designs that direct the plan for conducting the study.

Figure 7: Core characteristics of MMR (Creswell, 2011, p. 271).

These common features include orientations to method, philosophy and research design, and provide a rigorous description of what MMR may involve. In contrast to the definition produced by Johnson, Onwuegbuzie & Turner (2007), Creswell's approach to defining MMR is based on an analysis of practice and the practical applications of MMR. Teddlie and

Tashakkori (2010) prefer to build on the composite definition provided by Johnson, Onwuegbuzie & Turner (Johnson et al., 2007). They argue that the definition includes a level of methodological eclecticism, a characteristic which Teddlie and Tashakkori (2010) view as essential to MMR. More than just combining qualitative and quantitative methods, methodological eclecticism involves:

> *Selecting and then synergistically integrating the most appropriate techniques from a myriad of QUAL, QUAN, and mixed methods in order to more thoroughly investigate a phenomenon of interest* (Teddlie & Tashakkori, 2010, p. 8).

Along with eclecticism, eight other contemporary characteristics are later included by Teddlie & Tashakkori (2012) to form a comprehensive definition in Figure 8. Taken together, definitions by Creswell (2011) and Teddlie and Tashakkori (2012) provide a comprehensive set of characteristics that distinguish MMR from other forms of mono-method research.

Eight characteristics of contemporary mixed methods research
1. Methodological eclecticism 2. Paradigm pluralism 3. Iterative, cyclical approach to research 4. Set of basic "signature" research designs and analytical processes 5. Focus on the research question (or research problem) in determining the methods employed within any given study 6. Emphasis on continua rather than a set of dichotomies 7. Emphasis on diversity at all levels of the research enterprise 8. Tendency toward balance and compromise that is implicit within the "third methodological community" 9. Reliance on visual representations (e.g., figures, diagrams) and a common notational system

Figure 8: Nine characteristics of contemporary MMR (Teddlie & Tashakkori, 2012, p. 775)

These characteristics capture what distinguishes Mixed Methods from other methods but they do not capture what it means to conduct mixed methods research. For a more meaningful

definition of what it means to participate in the practice of mixing methods, Greene (2007) says:

> *Mixed methods actively invites us to participate in a dialogue-at the large table of empirical inquiry – multiple ways of seeing and hearing, multiple ways of making senses of the social world, and multiple standpoints on what is important and to be valued and cherished* (Greene, 2007, p. 20).

Greene's definition and stance towards mixing methods advocates for a dialogic approach to the practice and theory of MMR grounded in the social and behavioural sciences. Greene posits that mixed methods is a way of thinking which rests on the assumption that multiple legitimate approaches to social inquiry exist.

> *A mixed methods way of thinking is generative and open, seeking richer, deeper, better understanding of important facets of out infinitely complex social world* (Greene, 2007, p. 20).

These three definitions by Creswell (2011), Teddlie and Tashakkori (2012) and Greene (2007) encompass the core attributes, characteristics and values which constitute MMR and what it means to mix methods. Ultimately whether it is useful or not to try and exclusively define what Mixed Methods is, or is not, will be a question for the ongoing methodological conversation. For the purpose of this thesis it is useful to know what is generally regarded as MMR and what it means to engage in the practice of mixing methods.

Now that definition and meaning have been given to the term Mixed Methods Research the next section shall discuss **why** a researcher might choose to adopt a MMR approach to research. It shall look at the purposes for choosing a MMR approach and offer reasoning behind why a MMR approach has been adopted by this thesis.

3.2.2. Purposefully mixing methods

This section introduces approaches towards mixing methods in research and discusses the benefits of a purposeful approach. When designing a mixed methods study, Creswell & Clark (2011, pp. 54–63) say that there are four design principles which must be identified and carefully considered by the researcher, and these are:

1. Whether the mixed method design is fixed (linear) or emergent;

2. The appropriate design pattern to follow, usually from a typology or existing approach;
3. The research problem, purpose and questions; and,
4. The reason(s) for choosing a mixed methods approach.

This section will focus on the fourth of these principles, the reasons for choosing a mixed methods approach. The reasons for choosing a certain design (principles one and two) is contingent and perhaps inseparable from the research problem, purpose and questions motivating the researcher. Therefore, when deciding to follow a mixed methods approach it is important to first ask a question: What is the reason for mixing methods, why is a mono-method not a suitable approach?

According to Greene (2007) the main advantage gained from adopting a mixed methods approach is the multiple perspectives which combining different methods brings to a methodology. When studying complex social phenomena this can be essential for gaining a better understanding. According to Greene 'better understanding' in this case can take multiple forms:

- Enhanced validity or credibility of findings;
- Generating broader or deeper understandings of the phenomena;
- Producing innovative or challenging results through multiple often discordant perspectives;
- Foregrounding the axiological dimensions of work in a way that engages with differences and advances dialogue.

The pursuit of these different purposes leads to different inquiry questions, combinations of methods and approaches to analysis. In the mixed methods literature many studies can be grouped by their common purposes. In an empirical review of purpose in mixed methods research, Greene et al. (1989) found that several distinct purposes and design decisions were cited by researchers in reports of their work. The review resulted in a classification scheme (Table 6) which is widely used for identifying the purpose of mixed methods research.

Purposes for mixed method evaluation designs	
Triangulation	Triangulation seeks convergence, corroboration, correspondence of results from the different methods.
Complementarity	Complementarity seeks elaboration, enhancement, illustration, clarification of the results from one method with the results from the other method.
Development	Development seeks to use the results from one method to help develop or inform the other method, where development is broadly construed to include sampling and implementation, as well as measurement decisions.
Initiation	Initiation seeks the discovery of paradox and contradiction, new perspectives of frameworks, the recasting of questions or results from one method with questions or results from the other method.
Expansion	Expansion seeks to extend the breadth and range of inquiry by using different methods for different inquiry components.

Table 6: Purposes for mixed method evaluation designs (Greene et al., 1989, p. 259)

Bryman (2006) builds on this work through an analysis of the ways in which qualitative and quantitative research are integrated in practice. Bryman applies Greene's framework to evaluate the justification behind multi-strategy research (that is, Mixed Methods Research) through an analysis of 232 articles retrieved from the Social Sciences Citation Index (SSCI). From the analysis, Bryman concludes that in reality the reasons for conducting MMR may not always tally with practice. This may be the result of researchers' rationales not being thought through sufficiently, or that the rich data obtained through MMR skews the outcomes of research in unanticipated directions.

These findings serve as a caution to researchers planning to adopt a mixed methods approach, highlighting the importance of careful planning and preparation. They also highlight an

opportunity that the mixed methods approach may generate results which lead to better understanding of phenomena through generating new empirical puzzles, which is particularly beneficial for research that explores complex problems, particularly in social or behavioural science where many factors come into play (Mason, 2006). Further to the reasons already given, Mason (2006) offers a uniquely socially oriented rationale for choosing a MMR approach when the research is focused on social experience and lived realities. Mason posits that the benefits of such an approach extend beyond such general purposes as listed in Table 6 and help research, traverse and transcend multidimensional challenges.

To Mason, social experience and lived reality are multidimensional. Lives are lived, experienced and enacted simultaneously on different scales. Lived experiences transcend many scientific dualisms from the macro/micro scales to the socio-cultural/individual, structure/agency distinctions and even the qualitative/quantitative divide. Lived experience is not only about these individual dimensions, it is also about the connections within and across them. Therefore, the methods which a researcher draws on must be able to traverse and transcend the multiple dimensions of people's lives and match up to this multidimensional challenge. This is the value that a mixed methods approach brings to social research. In this way a mixed methods approach offers three specific benefits, listed in Figure 9.

Three benefits of MMR to social research
1. Thinking 'outside the box'
A mixed methods approach to social research encourages the researcher to reflect on how their approach to research is both shaped by their choice of method and the methods which are available to them. According to Mason our ways of seeing and asking questions are: *Strongly influenced by the methods at our disposal, because the way we see shapes what we can see, and what we think we can ask* (Mason, 2006, p.13). By mixing things up a researcher can explore new dimensions and see phenomena from different perspectives through the creative and innovative use of methods for data generation.

2. Theorising beyond common dichotomies

A mixed methods approach can help social researchers bridge the macro–micro theoretical dichotomy which often hinders the development of meaningful social theory and explanation.

> *The macro/micro boundary, insofar as it encourages people to situate their social science activity on one side of it or other, arguably therefore hinders the development of meaningful social theory and explanation* (Mason, 2006, p.15).

Mixed methods research can overcome this dichotomy by accommodating theoretically driven empirical research, and through an open multidimensional view promote a focus on how different dimensions and scales of social existence intersect or relate. This freedom allows a researcher to explore…

> *…how it is that what we might think of as primary micro or macro domains are shifting and fluid categories, and are in perpetual interplay. This allows the focus of the research (rather than its by-product of back-ground) to be upon how social experience and 'real lives' are simultaneously or connectedly 'big and little', global and local, public and private, and so on* (Mason, 2006, p. 15).

This allows the researcher to weave together data and argument, forming meaningful and empirically well founded research and social theory.

3. Enhancing and extending the logic of qualitative explanation

By mixing methods in a 'qualitatively driven' way Mason contends that better explanations are made possible than if a purely quantitative or qualitative logic were applied to theoretical explanation and generalisation in social research. Two core elements to this 'logic of qualitative explanation' which mixed methods can enhance are qualitative logic of comparison and cross-contextual and contextual explanations.

Firstly, the qualitatively driven approach enabled by mixed methods, where contexts are understood holistically (in-depth) and comparison occurs across cases at the level of analysis, is able to alleviate a fixation on standardisation when seeking to form comparisons and generalisation. This approach can help improve the capacity of research

to understand and interpret social change which does not occur in standard predictable ways.

> Secondly Mason contends that *situated and contextual understandings are at the centre of qualitative explanation and argument,* and that *if we are going to improve our capacity to explain and to ask and answer rigorous and useful questions in our complex social environment, we need to understand how contexts relate to social life, and factor this understanding in to our explanations* (Mason, 2006, p.17).

Sometimes we may hastily dismiss local contextual explanations as ungeneralisable, or not designed for that purpose. But we are missing an important opportunity for explanation between social understandings. By seeing how the processes and practices of social phenomena play out in specific contexts we can understand how they are contingent upon or embedded within context and lay the foundation for forms of cross-contextual explanation and comparison.

Figure 9: Three benefits of MMR to social research (Mason, 2006)

Mason's approach to MMR in social research brings together the issues of design and purpose through a dialogue between the issues and benefits, by questioning ridged (dichotomous) methodological thinking and challenging the researcher to step beyond common constraints. Mason's approach echoes Creswell's (2011) scepticism of adopting a rigid definition for MMR, an approach which advocates flexibility, openness and multiplicity. It is worth noting that perhaps the benefits of acquiring rich data sets and encountering unexpected outcomes may be more valuable than maintaining consistency between a research plan and its results, particularly when research is exploratory in nature.

Bryman's study highlights the importance of being explicit about the grounds on which MMR research is conducted, and to recognise that the outcomes may not be entirely predictable. It places the onus on the researcher to both clearly articulate the purpose for adopting an MMR approach and to be mindful of assumptions about the outcomes in case misjudgements lead to errors or inconsistencies in the research, a particularly pertinent point for the novice researcher. The next section addresses how the issue of assumptions about the

outcomes and consistency raised by Bryman are handled in this thesis by following a mixed methods design pattern.

3.2.3. Choosing a mixed methods design

This section presents the concept of a mixed methods design and discusses how adopting one is beneficial to mixed methods research. When design purpose is evaluated against design characteristics, a contingency table is formed and the result is a conceptual framework for classifying mixed methods designs (Greene et al., 1989). This is an approach which has formed the foundations for the development of what are now known as mixed methods design patterns. This section shall discuss the purpose and use of mixed methods design patterns, starting with a framework developed and used by Teddlie and Tashakkori (2006).

In Teddlie and Tashakkori's framework, different purposes, problems and questions lead to different mixed methods designs, and different designs can be categorised based on these three underlying characteristics to form design patterns. These are frameworks for conducting mixed methods research. Each design explains the relationship between different strands of research, and a research strand can be defined as: 'A phase of a study that include three stages – the conceptualisation stage, the experiential stage (methodological [and] analytical), and the inferential stage – often in an iterative or interactive manner' (Teddlie & Tashakkori, 2006, p. 145).

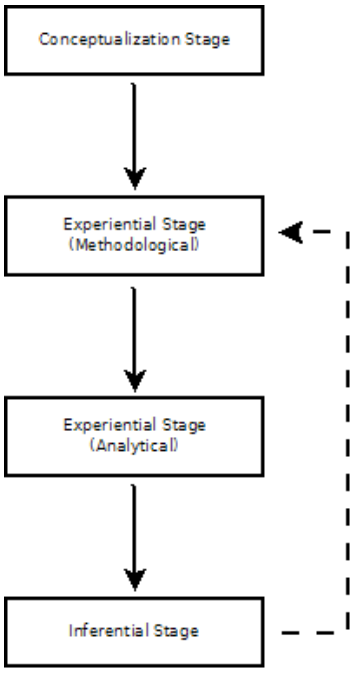


Figure 10: Example of a mono-method mono-strand design (Teddlie & Tashakkori, 2006, p. 16)

For example, Figure 10 illustrates a monomethod monostrand design pattern based on the framework. Design patterns and their associated strands can be compared by the type of approach (the methods employed) and the number of strands (or phases) of the study using a two dimensional matrix as shown in Table 7.

Design type	Monostrand	Multistrand
Mono method	Monomethod monostrand designs *e.g. Qualitative or Quantitative design*	Monomethod multistrand designs *e.g. Parallel monomethod or Sequential monomethod*
Mixed method	Quasi-mixed monostrand designs *e.g. Monostrand conversion design*	Mixed methods multi strand designs *e.g. Parallel, Sequential, Conversion, Multilevel or Fully integrated mixed designs*

Table 7: The Methods-Strands Matrix adapted from Tashakkori and Teddlie (2009, p. 145)

Following this classification framework by Teddlie and Tashakkori (2006), Creswell & Clark (2011) identified six typical mixed method designs through a review of mixed method studies. The patterns identified include the Convergent, Explanatory, Exploratory, Embedded, Transformative and Multiphase designs, which are described in Table 8.

The framework offers consistency between mixed methods studies and promotes improved validity and reflexivity when reporting study designs. This is particularly useful to researchers who are new to mixed methods, helping them grapple with the complexities inherent in a mixed methods approach and avoid potential disconnects between research designs and research outcomes (Creswell & Clark, 2011). But whether generalising mixed

methods to a typology is the most useful approach, or whether another approach such as a systematic or synergistic conceptualisation of the research process is better, is a point of debate among mixed methods researchers (Creswell 2011).

Mixed method design patterns	
Convergent	Research strands occur concurrently, and remain independent until they converge during analysis where results are mixed. Methods both qualitative and quantitative are prioritised equally in this design.
Explanatory	Research strands occur sequentially, with quantitative data collected and analysed in the first phase, and qualitative data collected and analysed in the second to explore first phase results in more detail.
Exploratory	Research strands occur sequentially, with qualitative data collected and analysed in the first phase to explore a research problem. Building on first phase quantitative data is then collected in a second phase study to examine results more broadly.
Embedded	Both qualitative and quantitative data are collected and analysed within a traditional quantitative or qualitative design. Qualitative or quantitative strands may be added to the design at the discretion of a researcher, depending on the studies' objectives.
Transformative	Qualitative and quantitative data are collected within a design shaped by a transformative theoretical framework, such as a feminist perspective.
Multiphase	A multiphase design combines both concurrent and sequential strands over a period of time within a program of study. This design is often used for program evaluation where quantitative approaches are used to support the development, adaptation and evaluation of specific programs.

Table 8: Mixed method design patterns (Creswell & Clark, 2011, pp. 70–73)

When it comes to designing a study, the typology of research designs is particularly useful for the novice researcher. While following a specific design pattern may constrain or limit the research, and although a design may not be complex enough to capture everything that happens, in practice they provide a practical starting point when planning a study. For this reason, a multiphase emergent MMR design pattern has been followed by this thesis, a design which fits with the purpose for choosing a mixed methods approach in the first place.

3.3. The sequential emergent multiphase research design

This part of Chapter 3 presents the multiphase emergent design for a mixed methods study that is adopted by this thesis. The mixed methods multiphase sequential emergent design is comprised from a program of studies conducted over a period of time to address the research problem. For this thesis, a multiphase emergent and sequential mixed methods research design is followed, in three phases illustrated by Figure 11. The strengths of this design are that different parts of the research problem can be addressed through an iterative process using methods most appropriate to them, that when brought together create a more holistic picture of the phenomenon under investigation (Creswell & Clark, 2011).

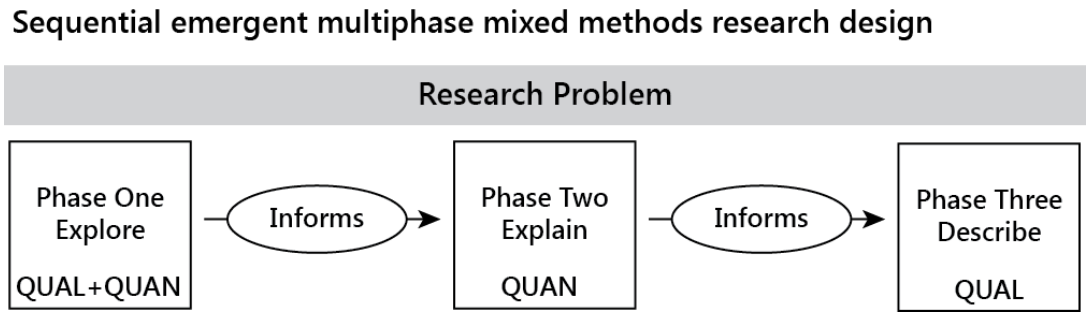


Figure 11: Sequential emergent multiphase mixed methods research design

In this design, data from each phase are collected and analysed sequentially, the results from a preceding phase inform the proceeding phase in a process which allows the research focus to emerge through its design (an emergent design). The design of an initial first phase (Phase One) of the sequential emergent multiphase design is guided by an aim(s) and supporting research questions derived from the research problem that help determine the appropriate methods and techniques. The design of an emerging phase (Phase Two for example) is then

guided by a mixed methods research question, for instance Phase Two may be designed to explain the results of Phase One. Phase Two also has its own research aim(s) and research questions that engage with the research problem. In the case of Figure 11 this process can be described as follows:

1. Phase One aimed to explore the research problem, i.e. by generating themes through focus group interviews with a sample of the population under study to find consensus and narrow the scope of research.
2. Phase Two then examined significant findings of the Phase One study more specifically to explain the Phase One results in greater detail; i.e. by asking specific questions or testing hypotheses through a survey questionnaire administered to a larger sample of the same population.
3. Phase Three then examined the results from the Phase Two study in greater depth to provide a deeper understanding of what they meant; i.e. through the use of in-depth interviews, narrative analysis or case study methods with specific individual cases.

In this design, results from each phase are analysed sequentially and thus separately, but are brought together in a process of mixing to form the thesis findings and complete the program of study. Following the same approach, methods for each phase were chosen sequentially, the choice of method was determined by a phase's aims and research questions. Underpinning the choice of method for each phase was the desire to hear from individuals about their experience and methods were chosen which could give individuals a voice as well as capture their experience and life circumstances.

For phase one the focus group technique was chosen to enable exploration of research questions with groups of international students. The aim stated in section 4.2.1. of this thesis was to explore the use of ICT by international students in interactions with important people in their lives at different stages of their sojourn. The focus group method facilitated group discussion and consensus making, which allowed a broad range of topics to be discussed and focused in to a set of specific questions for further investigation.

For the phase two study the survey method was chosen to provide explanation of questions arising from the phase one study. The aim stated in section 6.2.1. of this thesis was to investigate the relationship between mobile phone use and variables of interest within a

sample of international student population staying in Tasmania. The survey method allowed questions to be asked of a larger sample of the international student population to understand questions from a greater range of experiences and life circumstances.

For the phase three study the in-depth interview technique was chosen to provide detailed descriptions of an international student's experience and life circumstances. The aim stated in section 8.2.1. of this thesis was to understand the role of a mobile phone in an international student's Everyday Life Information Seeking (ELIS) as a particular case of ICT in an international student's everyday life. In-depth interviews allowed an international student's experience of information seeking to be described in detail and their perception of the mobile phone explored.

The purpose for adopting a sequential emergent mixed methods research design may vary, but for the example here the purpose is for triangulation. Denzin (1970, p. 301) identifies four kinds of triangulation, these are: Data triangulation, Investigator triangulation, Theoretical triangulation and Methodological triangulation.

- **Data triangulation** which involves triangulation by data sources. An example is theoretical sampling where multiple data sources relating to the phenomenon under analysis are sought;
- **Investigator triangulation** which involves multiple vs. single observers of the same phenomenon or object of inquiry;
- **Theoretical triangulation** which involves multiple vs. single perspectives in relation to the same set of observations or objects;
- **Methodological triangulation** which involves within-method triangulation and between-method triangulation.

The kind of triangulation in this case is Methodological triangulation with a focus on the correspondence between results of different methods. Methodological triangulation is further described by Denzin as 'The combination of two or more different research strategies in the study of the same empirical unit' (Denzin, 1970, p. 308). Denzin advises the relevance of a particular method to the research problem, the strengths and weaknesses of a method and its theoretical relevance. A benefit of following this approach is that the strengths of different methods may be leveraged to support each other in a holistic investigation (Denzin, 1970).

The mixing of qualitative and quantitative methods proposed in this research design can be seen as giving rise to inconsistency, particularly at the levels of research paradigm where questions of what constitutes knowledge – i.e. epistemology and truth, ontology – which underpin certain methods come into contact, and in cases conflict, number five on Creswell's (2011) list of controversies in Figure 6. To manage the inconsistencies between methods, the dialogic approach of Greene (2007) is adopted for this thesis. A researcher's stance towards paradigmatic inconsistency delineates their ontological, epistemological, methodological and axiological approach and ultimately the methods available to them when conducting research. A dialectic stance deals with difference through dialogue, different paradigms may be drawn upon provided difference and inconsistency is discussed constructively – paradigms are not seen as 'incompatible', or one better than another only different. This stance does not limit the methods available to a researcher, it views the use of multiple methods and engagement with their difference as a strength which leads to better understandings of phenomena in question.

The issue of mixing paradigms, approaches towards inconsistency and exactly how research purpose translates into a coherent MMR methodology that handles competing issues and priorities, are topics addressed in the remainder of this chapter.

3.4. Paradigms in research

This part of Chapter 3 presents the approach towards research paradigms taken in this thesis. Section 3.4.1 describes the elements of a research paradigm. Section 3.4.2 introduces the issue of paradigmatic inconsistency encountered by researchers who follow a mixed methods approach. Section 3.4.3 presents the traditional perspective of paradigmatic purity. Section 3.4.4 discusses the alternative paradigm pragmatism and section 3.4.5 presents the dialectic stance as a compromise between purity and pragmatism.

When conducting and reporting on research it is important for a researcher to articulate the paradigm(s) which underpin their way of thinking, ensuring that different 'ways of seeing' and 'what is seen' may be subject to scrutiny and justification (Mason, 2002). This reflexive act ensures that a level of consistency is maintained between research practice and thinking. It helps the researcher themselves to be aware that their way of thinking is among many other possibilities of varying worth. This process is particularly important for Mixed Methods Research (MMR) where mixing might not only occur at the level of method, but also at the

level of paradigm. To manage the issues associated with mixing research paradigms this section will address fundamental topics associated with research paradigms in MMR, starting with definitions.

3.4.1. Elements of the research paradigm

This section introduces the elements of what are known as research paradigms. A research paradigm is comprised from a set of common beliefs and assumptions about knowledge that guide an inquiry. A research paradigm can be defined as a 'shared belief system that influence the kinds of knowledge researchers seek and how they interpret the evidence they collect' (Morgan, 2007, p. 50).

An underlying research paradigm therefore shapes the process of research and the conduct of inquiry, but use of the term and its meaning are not consistent. In his review, Morgan (2007) identifies four versions of the paradigmatic concept in use by social researchers, and Figure 12 summarises them in a hierarchy from the most general to the most specific.

Levels of meaning and characteristics
1. Paradigm as world view: An all-encompassing perspective on ways of experiencing and thinking about the world, including beliefs about morals, values and aesthetics. This application could include virtually everything a person thinks or believes and is the most general application of the term. 2. Paradigm as epistemological stance: Treats epistemological stances such as realism, constructionism or idealism as belief systems that influence research questions, how they can be answered and issues associated with ontology, epistemology and methodology from the philosophy of knowledge. 3. Paradigm as a shared belief system: Beliefs about the nature of questions and answers in a research field are shared by a community of researchers who have common views as to which questions are most meaningful and which procedures are most appropriate for answering those questions.

4. Paradigm as research practice: Relies on specific exemplars of best or typical solutions to problems in a research field, such as research project case studies to illustrate broad principles and practices. This is the most specific use of the term.

Figure 12: Levels of the paradigmatic concept (Morgan, 2007)

These four versions are not mutually exclusive with each version forming part of a complete definition for what is meant by the term 'research paradigm', and no single version is better than another. Morgan (2007) summarises as follows:

> *The model examples researchers use to demonstrate the key content of their field reflect a set of shared beliefs about both the research questions they should ask and the methods they should use to answer them. Shared beliefs about research topics and methods are, in turn, based on epistemological stances that summarize researchers' assumptions about what can be known and how to go about such knowing. And at the broadest level, assumptions about the nature of knowledge and reality are an important component of each researcher's worldview* (p.54).

Of the four versions the second 'paradigm as epistemological stance' is the one most relevant to this research. According to Morgan (2007) this stance is the most common application of the paradigmatic concept and the one which has the most influence when it comes to mixing qualitative and quantitative methods.

In the paradigm as epistemological stance, different paradigmatic stances have a number of shared elements known as axioms, which form an axiomatic system. An axiom may be defined as 'the set of undemonstrated (and undemonstratable) "basic beliefs" accepted by convention or established by practice as the building blocks of some conceptual or theoretical system' (Lincoln & Guba, 1985, p. 33). Paradigms usually have several axioms in common, these are: Ontological assumptions, Epistemological assumptions, Methodology and Axiology. Different combinations of paradigmatic axioms result in different kinds of research paradigms; today some of the most well-known paradigms include positivism, post-positivism, constructivism, interpretivism and the transformative paradigm, but these are only some of many possible combinations.

Ontology – the nature of what exists

The axiom of ontology deals with two questions – firstly what is the nature of reality? (for social research this is the specific social reality), and secondly where can it be found? Theories about the nature of social reality that include idealist, relativist and realist theories are adopted (often implicitly) by a researcher. An ontology brings with it certain assumptions embedded in theoretical ideas that guide research and ultimately influence the methods which are used (Blaikie, 2007, p. 15).

Ontology / Epistemology	Shallow realist	Conceptual realist	Cautious realist	Depth realist	Idealist
Empiricism	x				
Rationalism		x			
Falsification			x		
Neo-realism				x	
Constructionism					x

Table 9: Combinations of ontological and epistemological categories (Blaikie 2007, p. 26).

Ontological positions range from a realist perspective through to idealist or relativist. The idealist perspective assumes that the external world is just appearance and does not exist independently from thought or the human observer. The realist position assumes that phenomena exist independently of thought and the human observer, and in between are a range of intermediate positions with differing answers to the nature of reality and where it can be found (Blaikie, 2007). Table 9 provides a matrix by Blaikie for comparing and contrasting the various ontological positions commonly found in research.

Epistemology – a theory of knowledge

The axiom of epistemology is concerned with what knowledge is, what can be known and how it can be known. Put simply it is a theory of how human beings come to have knowledge of the world around them, it deals with how we know what we know (Blaikie, 2007, p. 18; Crotty, 1998, p. 8). An epistemology offers claims as to which scientific procedures

(methods) can procure reliable social scientific knowledge; examples include empiricism, rationalism, falsification and constructionism, which are listed in Table 9 paired with their corresponding ontological positions.

Methodology – the research act

The term 'methodology' generally appears as an ambiguous term in discussions and descriptions of research practice (including research strategy and design) and is often only associated with the logistics of an inquiry. In practice the research methodology emerges from several intertwined concepts that include a researcher's philosophical assumptions (ontological and epistemological), inquiry logistics, guidelines for practice and socio-political commitments in science (Jennifer C Greene, 2006). Based on a comprehensive definition of what constitutes a research methodology in social inquiry by Greene (2006), Teddlie and Tashakkori (2009) summarise the research methodology as being:

> *...an approach to scientific enquiry specifying how research questions should be asked and answered. This includes worldview considerations, general preferences for designs, sampling logic, data collection and analytical strategies, guidelines for making inferences, and the criteria for assessing and improving quality* (p. 21).

This broad conceptualisation of what constitutes a research methodology encapsulates the entire research activity distinct from the methods, strategies and procedures to be employed when implementing the research design (such as sampling, data collection and analysis). But while this definition is comprehensive, a simpler definition provided by Denzin (1970) is preferred in this thesis. Denzin eloquently summarises that:

> *Methodology represents the principal ways in which the researcher acts on his or her environment through method* (Denzin, 1970, p. 6).

Axiology – values in research

Axiology covers the role of values in research, dealing with ethics, aesthetics and religion (Lincoln & Guba 2011). Where the ontology, epistemology and methodology are about matters of truth, the axiological question is about 'values of being, about what human states are to be valued simply by virtue of what they are'(Heron & Reason, 1997, p. 10). The axiological question may be answered in two parts:

1. Is knowing the truth in proportional form an end in itself, and the only end in itself? To what extent would you as a researcher go in order to learn the truth, how will you know when you have gone too far?
2. What is the ultimate purpose of human inquiry? Is it to understand and reconstruct the world in pursuit of proportional knowledge or more practical with the intent of changing the world?

The participatory research paradigm proposed by Heron & Reason (1997) provides an example of how the axiological question may be handled. But the question is personal, requiring the researcher to acknowledge that research is to an extent value bound, not value free. Traditionally the pursuit of truth has required that a researcher, to the best of his or her ability, remain objective and remove his or her self from the equation. Through the reflexivity act of answering the axiological question, a researcher and a research paradigm may make their claims to knowledge more accountable, which according to Heron and Reason (1997), and Lincoln et al., (2011), is a good thing.

3.4.2. Paradigmatic inconsistency when mixing methods

This section addresses the issue of paradigmatic inconsistency which arises when a researcher mixes methods. As research thinking and practice (the research act) are interrelated, it stands that method and their results will take on different meaning, depending on the research paradigm applied. By mixing different methods and potentially different paradigms a researcher risks running into epistemological conflict and obscuring the process by which conclusions are arrived at, if their approach to managing this conflict is not properly articulated (Denzin, 1970). The issue of consistency is particularly important when theory is part of research. Methods used to test or construct theory may take on different meanings depending on the paradigm(s) applied, leading to significantly different conclusions, depending on the theory of knowledge. In some cases, combining different stances results in inconsistency – even conflict between different elements of a paradigm's axiomatic system. A pertinent example is the perceived incompatibility between the positivist/post-positivist and constructivist research paradigms (Lincoln & Guba, 1994).

The issue of paradigmatic inconsistency is significant when it comes to a mixed method approach to research. While adopting a mixed methods approach can enhance the dimensions of data available when addressing a research problem, the use of multiple approaches can

also obscure the process by which data are brought together (mixed) and can cast doubt on the epistemological status of the work. Choosing at which level to ‘mix’ in the research process and how that mixing occurs are important considerations for the mixed methods researcher. In mixed methods research the issue of 'mixing' is commonly encountered in discussions about the combining of qualitative and quantitative methodologies, but in practice mixing may occur at different levels including the research paradigm, mental model and/or in the methodology.

Broadly different approaches to the issue of mixing, and the combining of different elements in an axiomatic system, fall into a number of common stances. Greene (2007) offers a summary of major stances when it comes to mixing paradigms in mixed methods research in Figure 13.

Major stances towards the nature and role of paradigms in MMR
Purist ▪ Paradigms are integrally constituted by sets of interconnected philosophical assumptions (ontological, epistemological, methodological) that must be respected and preserved. The assumptive sets of different paradigms are incommensurable. ▪ Paradigmatic assumptions importantly guide and direct practical inquiry decisions. Because the assumptions of different paradigms are incompatible (incommensurable), it is not possible to mix paradigms in the same way.
A-Paradigmatic ▪ Paradigms comprise philosophical assumptions and stances regarding reality, knowledge, methodology and values that are logically independent and therefore can be mixed and matched in varied combinations. ▪ What matters most in guiding practical inquiry decisions are the practical characteristics and demands of the inquiry context and problem at hand, not abstract philosophical paradigms.

Substantive theory

- Paradigms comprise philosophical assumptions and stances regarding reality, knowledge, methodology and values. Paradigms may well be embedded in or intertwined with substantive theories.
- What matters most in guiding practical inquiry decisions are the substantive issues and conceptual theories relevant to the study being conducted, not philosophical paradigms in and of themselves.

Complementary strengths

- Paradigms are constituted by sets of interconnected philosophical assumptions regarding reality, knowledge, methodology, and values that must be respected and preserved. The assumptive sets of different paradigms are not fundamentally incompatible but are different in important ways.
- Paradigmatic assumptions importantly guide and direct practical inquiry decisions, along with context and theory. Because the assumptions of different paradigms are different in important ways, methods implemented within different paradigms should be kept separate from one another. In this way, paradigmatic and methodological integrity can be maintained.

Dialectic (dialogic)

- Paradigms are constituted by sets of interconnected philosophical assumptions regarding reality, knowledge, methodology and values. The assumptive sets of different paradigms are different in important ways, but paradigms themselves are historical and social constructions and so are not inviolate or sacrosanct.
- Paradigmatic assumptions importantly guide and direct practical inquiry decisions, along with context and theory. Important paradigm differences should be respectfully and intentionally used together to engage meaningfully with difference and, through the tension created by juxtaposing different paradigms, to achieve dialectical discovery of enhanced, reframed, or new understandings.

Alternative paradigms

- Paradigms comprising sets of various philosophical assumptions regarding reality, knowledge, methodology and values. Historically philosophical incommensurabilities among paradigms are reconcilable through new, emergent paradigms, such as contemporary pragmatism, scientific or critical realism, for transformation-emancipation.

- Traditional paradigms are no longer relevant to practice. What should guide mixed methods practice, along with contextual and theoretical demands, is a new paradigm (for example, pragmatism) that actively embraces and promotes the mixing of methods.

Figure 13: Summary of major paradigmatic stances (Greene, 2007, pp. 68–69)

For the purposes of this thesis the dialectic stance has been adopted to mediate and guide decisions made during inquiry when dealing with paradigmatic concerns. In the following three parts the merits of paradigmatic purity, the alternative paradigm (pragmatism) and the dialectic approach will be discussed. These three approaches offer three contrasting views on the issue of mixing and help frame the issue in its historical context and the evolving conversation around MMR.

3.4.3. Paradigmatic purity

This section presents a stance towards paradigms in research known as paradigmatic purity. Paradigmatic purity poses that paradigms are constituted by a set of interconnected or interlocking philosophical assumptions that form an integral whole, and that must be respected and preserved (Greene, 2007). The purist stance maintains that mixing can only occur within a given paradigm, not between different paradigms and that simultaneously practising multiple paradigms is not possible.

This is not to say that mixing methodologies within a given paradigm is not possible. A point that is repeatedly stressed by purist advocates, Lincoln, Lynham and Guba, is that the purist argument is not about method (Lincoln et al., 2011). They point out that while approaches

such as the naturalistic paradigm prioritise qualitative data, there is scope for the investigator to utilise both qualitative and quantitative methods (Lincoln & Guba, 1985).

It is common for proponents of the purist stance to simply argue that the paradigmatic positions on which methodologies are founded make them 'incompatible' and not commensurable. But a research paradigm can be compared and contrasted with other paradigms using a range of common axiomatic elements referred to as issues or assumptions (Lincoln et al., 2011). These axiomatic elements primarily include the elements of ontology, epistemology, methodology and axiology. Table 10, known as a 'paradigmatic contrast table', provides a comparison of these elements between several prominent research paradigms.

	Positivism	**Post-positivism**	**Critical theory**	**Constructivism**
Ontology	Naive realism - "real" reality but apprehensible.	Critical realism - "real" reality but only imperfectly and probabilistically apprehensible.	Historical realism - virtual reality shaped by social, political cultural, economic, ethnic, and gender values; crystallized over time.	Relativism - local and specific constructed and co-constructed realities.
Epistemology	Dualist/Objectivist ; findings true.	Modified dualist/objectivist; critical tradition/community; findings probably true.	Transactional/subjectivist; value-mediated findings.	Transactional/ subjectivist; created findings.
Methodology	Experiential/manipulative; verification of hypotheses; chiefly quantitative methods	Modified experiential/manipulative ; critical multiplism; falsification of hypotheses; may include qualitative methods	Dialogic/dialectical	Hermeneutical/ dialectical
Axiology	Propositional knowing about the world is an end in itself, is intrinsically valuable.		Propositional, transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable.	

Table 10: Modified basic beliefs (metaphysics) of Alternative Inquiry Paradigms table (Lincoln & Guba, 1994, p. 193).

In recent methodological discourse the view that different paradigms generally are not commensurable and thus cannot be mixed is shifting, with even Lincoln and Guber (2011) cautiously acknowledging that it is possible to blend elements of one paradigm into another, such as between positivism and post-positivism or between interpretivist and constructivist

paradigms. Yet they firmly point out that issues emerge when researchers 'pick and choose' between axiomatic elements in vastly different paradigms such as between the positivist and constructivist paradigms as their axiomatic systems are inherently contradictory.

3.4.4. The alternative paradigmatic stance – pragmatism

This section presents the alternative paradigm of pragmatism. Within the emerging community of mixed methods researchers there is a view that the research paradigm of pragmatism (Tashakkori and Creswell 2007) is the 'best fit' paradigm to underpin a practical and inclusive approach to mixed methods research in the 21st century. Adopting pragmatism thus becomes an alternative to pursing paradigmatic purity, arguing that traditional paradigms are no longer relevant. The following sub-sections provide an overview of the pragmatic research paradigm, and discuss why it is being championed as the 'best fit' paradigm to bridge qualitative and quantitative divides and move mixed methods research beyond the paradigmatic debate.

Kenneth Howe and the compatibility thesis

The purist stance, also known as the 'incompatibility thesis', holds that while methods may appear compatible in practice there are important epistemological difficulties that make certain methods incommensurable with one another. A primary example is the distinction between the post-positivist and constructivist research paradigms which primarily prioritise quantitative or qualitative methods respectively, making them fundamentally incompatible in the eyes of a paradigmatic purist. In response to this stance emerged the 'compatibility thesis', a stance first proposed by Kenneth (Howe, 1988) which proposes that the combining of quantitative and qualitative methods is appropriate, even necessary, and that the epistemological difference between paradigms (inherent in their axiomatic systems) can be overcome.

Kenneth Howe's compatibility thesis advances the argument that paradigms must not only inform (determine) research methodologies in a one-way fashion but that paradigms must also be informed by research methods successfully employed, creating a two-way relationship between research paradigms and their methodologies.

> To Howe, *'a philosophical perspective is valuable just to the extent that it helps shape practice, and helping to shape practice requires careful attention to just what the practice is'* (Howe, 1988, p. 15).

The compatibility thesis advocates the evaluation of paradigms against how well they square with the demands of practice and in doing so rejects abstract epistemological considerations which cannot be squared with the practice of gaining empirical knowledge. The thesis holds that when this conversation between paradigm and methodology is had, incompatibilism can be overcome.

The pragmatic rule

The compatibility thesis of Kenneth Howe has come to be known more generally as the pragmatic rule (or method), which forms the foundation of the pragmatic paradigm. Johnson and Onwuegbuzie (2004) expand on the work of (Howe, 1988) and other pragmatists including John Dewey, William James and Charles Sanders Peirce to offer a succinct description of the pragmatic rule for mixed methods research:

> *The current meaning or instrumental or provisional truth value of an expression is to be determined by the experiences or practical consequences of belief in or use of the expression in the world* (Johnson & Onwuegbuzie, 2004).

This outcome oriented rule could be applied to scenarios as simple as thinking about what happens if you do X or as complex as conducting a research experiment. This pragmatic rule allows researchers to think about the dualisms inherent in the purist stance and take a pluralist position by thinking about how different methodologies and paradigms can be mixed fruitfully in research.

Johnson and Onwuegbuzie (Johnson & Onwuegbuzie, 2004) provide an original set of twenty-two core characteristics of the pragmatic paradigm, which Teddlie and Tashakkori (2009) later summarise into twelve more general characteristics displayed in Table 11. They refer to this form of pragmatism as ‘pragmatism of the centre’ or dialectical pragmatism. Where ‘pragmatism of the left’ implies antirealism and strong pluralism, and ‘pragmatism of the right’ implies strong realism and weak pluralism, ‘pragmatism of the centre’ poses a balance between the realist and pluralist views in pragmatism (Johnson, Onwuegbuzie, & Turner, 2007).

Pragmatism of the centre – Dialectical pragmatism

1. The project of pragmatism has been to find a middle ground between philosophical dogmatisms and scepticism and to find workable solutions to long-standing philosophical problems.
2. Pragmatism rejects binary (either-or) choices suggested in traditional dualisms (e.g. rationalism vs. empiricism, realism vs. antirealism, free will vs. determinism, appearance vs. reality, facts vs. values, subjectivism vs. objectivism).
3. Pragmatism replaces the historically popular epistemic distinction between subject and external object with the naturalistic and process-oriented organism-environment transaction.
4. Pragmatism views knowledge as being both constructed and based on the reality of the world one experiences and lives in.
5. Theories are viewed instrumentally (they are 'true' to different degrees based on how well they currently work; workability is judged especially on the criteria of predictability and applicability).
6. Pragmatism endorses pluralism and carefully considered integrative eclecticism (e.g., different, even conflicting theories and perspectives can be useful; observations, experience, and experiments are all useful ways to gain an understanding of people and the world).
7. Pragmatism views inquiry as occurring similarly in research and day-to-day life. Researchers and people test their beliefs and theories through experience and experimenting, checking to see what works, what solves problems, what answers questions, what helps for survival.
8. Capital T truth is what will be the final opinion, perhaps at the end of history. Lowercase t truths (i.e., the instrumental, partial, and provisional truths) are what one obtains and lives by in the meantime.
9. Pragmatism prefers action to philosophising and endorses "practical theory".
10. Pragmatism takes an explicitly value-oriented approach to research that is derived from cultural values and specifically endorses shared values, such as democracy, freedom, equality and progress.

11. According to Peirce, ‘reasoning should not form a chair which is no stronger than its weakest link, but a cable whose fibres may be ever so slender, provided they are sufficiently numerous and intimately connected’ (1868, in Menand, 1997, p.56).
12. Pragmatism offers the "pragmatic method" for solving traditional philosophical dualisms as well as for making methodological choices.

Table 11: General characteristics of pragmatism (Teddlie & Tashakkori, 2009, p. 74)

Moving beyond the forced either/or choice between exclusive paradigms changes the focus of the methodological conversation from whether combining elements is legitimate to how this combination is to be accomplished.

Practical implications of pragmatism

For the mixed methods researcher adopting a pragmatic paradigm allows for the choices of methodology and epistemology to be considered equally, one is not privileged over the other. Where the traditional purist stance towards paradigms in research tended to privilege epistemological issues over the choice of methodology (where the epistemology determines the methodology used), the strength of a pragmatic approach is that the researcher can move beyond the dichotomy created through the either/or choice of qualitative or quantitative research methodologies (Teddle and Tashakkori 2009).

Drawing on the pragmatic paradigm, Teddlie and Tashakkori (2009) offer a useful alignment of both the qualitative and quantitative methodological traditions by illustrating that at a general level the elements of qualitative and quantitative methodology and the relationship between these two ways of thinking can be usefully located along a continuum of qualitative–mixed–quantitative methodological elements. This continuum is offered as a dialectic alternative to the traditional didactic paradigm contrast table often referred to by paradigmatic purists. Other elements of research practice including data, design, analysis and interpretation of results can also be useful placed along a multidimensional continua as illustrated by Figure 14.

Sphere of concepts, purposes, questions, objectives		
Deductive	⟷	Inductive
Objective	⟷	Subjective
Value free	⟷	Value involved
Confirmation	⟷	Understanding
Explanatory	⟷	Exploratory

Figure 14: Excerpt from Multidimensional Continuum of Research Projects (Teddlie & Tashakkori, 2009, p. 95)**.**

However, while pragmatism offers researchers a workable methodological and philosophical solution to the purist stance, whether it is appropriate is the subject of an ongoing conversation in the mixed methods research community. It is also one of the controversies identified by Creswell, who questions whether such a detailed set of methodological and philosophical positions is in fact needed at all (Creswell, 2011; Johnson et al., 2007). Adopting an alternative stance is one among a number of approaches identified by Greene (2007) in Figure 13 and if it were placed along a continua adopting the pragmatic paradigm would be dichotomous to the stance of paradigmatic purity.

3.4.5. The dialectic stance

This section presents a compromise toward the stances of paradigmatic purity and the alternative paradigm of pragmatism known as the dialectic stance. In the interest of finding some middle ground between that of paradigmatic purity and an alternative paradigm, Greene (2007) advocates a dialectic stance toward mixed methods research which enables meaningful engagement with difference, a view formed through working as an evaluator of social and educational public programs in the United States. To Greene, a mixed methods approach is a way of thinking that is more than simply a process of methodological design. It is an orientation towards research rooted in a multiplistic mental model where important understanding and discernments are generated through the juxtaposition of different lenses,

perspectives and stances. In the dialectic stance, difference is considered constitutive and fundamentally generative; the stance seeks:

> *An understanding that is woven from strands of particularity and generality, contextual complexity and patterned regularity, inside and outside perspectives, the whole and its constituent parts, change and stability, equity and excellence and so forth* (Greene, 2005, p. 208).

This dialogic engagement with difference recognises that the dimensions of philosophy, methodology and ideology are fundamental intertwined. A dialectical stance invites multiple ways of knowing into a study. It actively engages with epistemological differences: respecting multiple ways of knowing, understanding and respecting the contradictions between them, and moves beyond the either/or contractions of different paradigms by working constructively with the tensions in a conversation to learn from different views rather than a contest or some kind of battle to see who wins.

Engaging methodologically with difference implies that methodologies that are important in different ways are included where possible and appropriate. Including different methods and methodologies in a mixed methods study enhances its generative potential and its potential to respect, appreciate and accept diversity in the substance of 'what is being studied'. Ways of knowing are also ways of valuing and a dialectical stance reflects an ideological stance towards difference. A mixed methods way of thinking offers the opportunity for meaningful enquiry that engages with difference and diversity. In a social context research aspires to a pluralistic society where we live with, appreciate and accept difference and diversity (Greene, 2007).

3.5. Including theory in research

This part of Chapter 3 presents a discussion of theory in research. Section 3.5.1 describes the role of theory and approaches towards theory generation, and then section 3.5.2 introduces the concept of a research strategy linked to the role of theory in research.

> *The function of theory, which I define as an integrated body of propositions, the derivation of which leads to explanation of some social phenomenon, is to give order and insight to research activities* (Denzin, 1970, p. 5).

In this thesis, social theory guides research and the results of research are in dialogue with theory. Theory gives order to the multiphase mixed methods program of study and guides questioning in each phase of research. The views of Denzin on social theory resonate with this approach; to Denzin ‘theory, conceptualization, and empirical activity are interwoven in a contextual operation such that theory guides research while research guides theory’ (Denzin, 1970, p. 56) and it is in this way that theory is included in this thesis.

3.5.1. The role of theory

This section shall discuss how theory gives order and insight to research activities, explaining how theory can be treated in mixed methods research and how it gives rise to a research strategy. According to Creswell & Clark (2011) in mixed methods research theory can provide a lens which guides the formation of research questions and how they can be addressed, theory brings coherence to a body of work by creating consistency between phases or distinct studies that may at first appear disjointed due to the often heterogeneous nature of the research problem being pursued. However, theory can have a far more significant place in research than just as a lens to guide it, theorising can be an active part of research which includes theory generation and testing.

> *If social research is about the systematic gathering of evidence and data, then theorizing represents the attempt to order this information into some kind of explanatory framework* (Layder, 1998, p. 10).

This thesis deals with social theory, which can be defined as 'an integral body of propositions, the derivation of which leads to explanation of some social phenomenon' and their function is 'to give order and insight to research activity' (Denzin, 1970, p. 5). Put simply, 'social theories are explanations of recurrent patterns or regularities in social life' (Blaikie, 2010, p. 124).

Following these definitions, theorising is the process of ordering information (evidence and data) into some kind of explanatory framework. This theoretical work may occur at any of five different levels, with the function of theory generated varying at each level (Denzin 1970).

1. Ad-hoc classificatory system, consisting of arbitrary classes for summarising data.
2. Categorical system or taxonomy, a system of classes constructed to fit the subject matter so that relationships amount classes can be described.

3. Conceptual framework, descriptive categories are placed within a broad structure of both explicit and assumed propositions.
4. Theoretical systems represents a combination of taxonomies and conceptual schemes along with descriptions and predictions in a deductive fashion.
5. Empirical-theoretical system, similar to a theoretical system but founded on an empirical base.

Further, the application of social theory and its relationship with empirical data can be distinguished by the scope of its content. Theory may be arranged in an order from theory with the most general scope to the most specific (Denzin, 1970, p. 68).

1. Grand (or general social systems) theory such as the phenomenology of Shultz, can be thought of as a master conceptual scheme from which subsidiary theory(s) can be derived. It is a total theoretical system which concerns itself with broad explanations of whole societies and their processes or general aspects of social reality at macro and micro levels. It can provide a basis for codifying empirical generalisations and specific theories. Such a theory is fine for description, but has limited application for explanatory or predictive purposes. This theory can act as a model to guide research, and theory which is developed out of engagement with empirical data can then modify and shape the theoretical model (Layder, 1998, p. 15).
2. Middle-range theory is theory of a deliberately limited conceptual range, usually derived from grand theory or a theoretical system and tested empirically.
3. Substantive theory is similar to middle-range theory but developed from a substantive empirical or problem area, rather than a conceptual one.
4. Formal theory works with a concept or within a conceptual area of analysis to analyse the substantive areas which fall within, forming a single theory of that concept. Alternatively, multi-focused formal theory occurs when a series of interrelated concepts are analysed across multiple substantive areas.

Each level of theory will have different implications and applications for research; the act of generating and/or testing Grand theory compared with Middle-range or Substantive theory will require significantly different methodological approaches. Generally well known approaches to linking theory and research are the Middle-range theory of Merton (Merton, 1968), and the Grounded theory of Glaser and Strauss (Glaser & Strauss, 2009) which deals

with substantive theory. Another more recent approach, known as Adaptive Theory, by Layder (Layder, 1998) has also emerged which seeks to address challenges in the other two approaches.

Merton's Middle-range theory is a practical approach to theory, a response to the prevalence for either Grand (General) theory or radical empiricism in social science research towards the middle of the 20th century. Merton sought an alternative to these two extreme approaches to handling theory in research and a means of developing theory which was of use to the research when dealing with practical problems.

> *Theories that lie between the minor but necessary working hypotheses that evolve in abundance during day-to-day research and the all-inclusive systematic efforts to develop unified theory* (Merton, 1968, p. 39).

His solution was what he called theories of the middle range, and according to Merton eight attributes define Middle-range theory (Figure 15). Merton's Middle-range theory recognises the interplay between theory and data that research findings are an important source of stimulus for theory development.

Summary of the eight attributes of Middle-range theory

1. Middle-range theories consist of limited sets of assumptions from which specific hypotheses are logically derived and confirmed by empirical investigation.
2. These theories do not remain separate but are consolidated into wider networks of theory.
3. These theories are sufficiently abstract to deal with differing spheres of social behaviour and social structure, so that they transcend sheer description or empirical generalisation.
4. This type of theory cuts across the distinction between micro- and macro-sociological problems.
5. Total sociological systems of theory (Grand or Meta theory) represent general theoretical orientations rather than the rigorous and tight knit systems envisaged in the search for a "unified theory" in physics.

6. As a result, many theories of the middle range are consonant with a variety of systems of sociological thought.
7. Theories of the middle range are typically in direct line of continuity with the work of classical theoretical formulations.
8. The middle range orientation involves the specification of ignorance. Rather than pretend to have knowledge where it is in fact absent, it expressly recognises what must still be learned in order to lay the foundation for still more knowledge. It does not assume itself to be equal to the task of providing theoretical solutions to all the urgent practical problems of the day but addresses itself to those problems that might now be clarified in the light of available knowledge.

Figure 15: Summary of the eight attributes of Merton's Middle-range theory (Merton, 1968, p. 68)

In contrast to the work of Merton and the deductive approach of Middle-range theory, the grounded theoretical approach of Glaser and Strauss emerged as a rejection of Logico-deductive theory such as the Middle-range theory popular at the time. Their approach to theory shifted the focus from theory logically deduced from *a priori* assumptions to theory generated as part of the research process. Glaser and Strauss argue that theory cannot be separated from the process by which it is generated.

> *Generating theory from data means that most hypothesis and concepts not only come from the data, but are systematically worked out in relation to the data during the course of the research. Generation a theory involves a process of research* (Glaser & Strauss, 2009, p. 6)

A grounded theoretical approach emphasises the systematic discovery of theory from data, theory is a strategy for handling data in research which provides models or conceptualisations for describing and explaining the data. To this end the role of theory is described by Glaser and Strauss (2009) as:

1. to enable prediction and explanation of behaviour;
2. to be useful in the theoretical advance of sociology;

3. to be useable in practical applications, prediction and exploitation should be able to give the practitioner understanding and some control of situations;
4. to provide a perspective on behaviour – a stance to be taken towards data; and
5. to guide and provide a style for research on particular areas of behaviour.

Understanding phenomenon is a developmental process that involves a variety of data, methods and situations. As concepts and insights emerge during research they are explored and may be 'tested' by including further comparative groups. This process continues until saturation is reached and an adequate account or explanation of the phenomena has emerged (Blaikie 2010).

The Middle-range theory of Merton and the Grounded theory of Glaser and Strauss emerged in response to the state of sociological and methodological thought at the time. They respond in opposite ways to the relationship between theory and research – one deductive testing and building on existing theory, the other inductive and starting with research to develop theory, but neither approach combines both theory development and theory testing.

In contrast to the approach of Middle-range theory and Grounded theory, Adaptive theory by Derek Layder takes an iterative and open ended approach to theory development and testing in research. Layder sees theorising as not a discrete stage at the start or end of the research process but a continuous aspect that may occur at any stage.

> *It attempts to combine an emphasis on prior theoretical ideas and models which feed into and guide research while at the same time attending to the generation of theory from the ongoing analysis of data* (Layder, 1998, p. 19).

The Adaptive approach focuses on the construction of theory in the context of ongoing research by utilising elements of prior theory in conjunction with theory that emerges from data collection and analysis; both prior theory and research data are treated equally in the emergence of theory. This approach does not limit or exclude the inclusion of Grand theory, considering it a source of theoretical ideas and as holding an important place in the overall accumulation of knowledge.

> *Adaptive theory is accretive, it is an organic entity that constantly reformulates itself both in relation to the dictates of theoretical reasoning and the 'factual' character of the empirical world* (Layder, 1998, p. 27).

The adaptive approach recognises the intertwining of life world and system elements in society. The theory which emerges may attempt to depict linkages between these elements of society such as the connection between structure and agency or macro and micro levels of analysis. It is an approach which attempts to take into account the layered and textured nature of social reality.

The deductive logic of Merton, Glasser and Strouse's inductive logic and the Abductive inference of Layder provides different views of the relationship between research and theory and how the goals of theory testing and generation are achieved. Each approach has its own merits, and the choice of which logic is appropriate will depend on a researcher's underlying paradigmatic stance and that of their research community (Blaikie, 2007, p.56). In this thesis an Abductive logic of inquiry aligns with the dialogic stance taken towards research paradigms in the multi-phase mixed methods study. That said, a deductive logic has been consistently followed as the program of study is informed by theory which consistently guides questioning and investigation through each phase. In this way the logic of inquiry guides the research process and forms a research strategy (Blaikie, 2007). The next section shall expand on this concept and logic of inquiry in more detail.

3.5.2. Research strategy

This section introduces the concept of a research strategy and explains how certain approaches towards theory in research are linked to the conduct of research. The consideration of theory and method in a research methodology is guided by the research paradigm, which provides consistency to the research methodology by acting as a framework through which the relationship between method and theory can be approached. In this context methodology represents the principal ways in which the researcher acts on his or her environment through method (Denzin, 1970).

> *His methods, be they experiments, surveys, or life histories, lead to different features of this reality, and it is through his methods that he makes his research public and reproducible to others' making that environment meaningful* (Denzin 1970, p. 5).

The movement between theory and the selection of method can be known as the research activity. This process is personal and unique to the individual researcher and their research problem. Order is given to the interrelationship between theory, methodology and research activity through the research strategy and its underlying logic of inquiry. In Table 12 Blaikie (2010) compares four contrasting research strategies and their logic of inquiry.

	Inductive	Deductive	Retroductive	Abductive
Aim	To establish descriptions of characteristics and patterns	To test theories, to eliminate false ones and corroborate the survivor	To discover underlying mechanisms to explain observed regularities	To describe and understand social life in terms of social actors' motives and understanding
Ontology	Cautious, depth or subtle realist	Cautious, or subtle realist	Depth, or subtle realist	Idealist, or subtle realist
Epistemology	Conventionalism	Conventionalism, Falsification	Modified neo-realism	Constructionism
Start	Collect data on characteristics and/or patterns	Identify a regularity to be explained	Document and model a regularity	Discover everyday lay concepts, meanings and motives
	Produce descriptions	Construct a theory and produce hypothesis	Describe the context and possible mechanisms	Produce a technical account from lay accounts
Finish	Relate these to the research question(s)	Test the hypothesis by matching them with data	Establish which mechanism(s) provide the best explanation in that context	Develop a theory and elaborate it iteratively

Table 12: Revised research strategies from Blaikie (2007, p. 67).

Inductive logic

Scientific thinking and inquiry is usually informed by an inductive logic sometimes referred to as empiricism, and the logic stresses that observation must be the foundation of scientific knowledge and this its starting point. The inductive logic is underpinned by shallow realist ontology and the epistemology of empiricism which assumes that the regularities of reality can be described and explained through observation guided by appropriate objective procedures (Blaikie 2007, p. 59).

The goal of inductive research is to predict wider patterns and changes in social phenomena using regularities such as trends, commonalities and averages observed through empirical research. The inductive strategy is commonly used to study both natural and social phenomena but in its original form will only lead to descriptions of the phenomenon under study. To Mason (2006) the study of social phenomena following an inductive research strategy must involve more than simple empirical observation.

> *Exploring as fully as possible the situational contours and contexts of social process, and then making strategic and theoretically driven comparisons with similar processes in other contexts, or similar contexts where different process occurs, to generate explanations* (Mason, 2006, p. 16)

This is possible by adopting different ontological and epistemological assumptions such as the subtle realist ontology and the epistemology of conventionalism (as shown in Table 5) which allows for limited generalisations from data and explanations to be established. The research paradigms of interpretivism and constructivism are commonly associated with an inductive research strategy.

Deductive logic

Deductive logic or the hypothetic-deductive method offers an alternative to the inductive logic of inquiry. This logic is founded on the cautious realist ontology and the epistemology of falsification; where the inductive logic seeks evidence to confirm generalisations, deductive logic seeks to falsify hypotheses.

> *Instead of starting with observations, the first stage is to produce a possible answer to the question; to look for an explanation for the problem in existing theory, or to invent a new theory* (Blaikie, 2007, p. 71).

This approach emphasises a hypothetical-deductive approach towards theory, where theoretical hypotheses are formulated in advance of research to guide inquiry and subsequent theorising. Karl Popper's (2005) version of the deductive logic exemplifies the process which a researcher must follow, and Blaikie (2007, p. 71) summarises Popper's logic as follows:

1. Begin by putting forward a tentative idea, a conjecture, a hypothesis or a set of hypotheses that form a theory.

2. With the help, perhaps, of other previously accepted hypotheses, or by specifying conditions under which the hypotheses are expected to hold, deduce a conclusion, or a number of conclusions.
3. Examine the conclusions and the logic of the argument that produced them. Compare this argument with existing theories to see if it constitutes an advance in our understanding. If you are satisfied with this examination:
4. Test the conclusions by gathering appropriate data; make the necessary observations or conduct the necessary experiments.
5. If the test fails, i.e. if the data are not consistent with the conclusion, the 'theory' must be false. The original conjecture does not match up with reality and must therefore be rejected.
6. If, however, the conclusion passes the test, i.e. the data are consistent with it, the 'theory' is temporarily supported; it is *corroborated*, not proven to be true.

The retroductive logic

The retroductive logic of inquiry is founded on the depth realist ontology and a neo-realist epistemology and the research paradigms of structuralism and constructionism are commonly associated with the retroductive research strategy. If a structuralist paradigm is a factor then an investigation will focus on underlying social structures, whereas social mechanisms will be the focus of investigation if a constructionism paradigm is preferred (Blaikie, 2010).

The aim of the retroductive research strategy is to discover underlying structures or mechanisms which in different contexts explain observed regularities. Theory or explanation is achieved by establishing the existence of a hypothesised structure or mechanism, which is responsible for producing an observed regularity.

The researcher works from data to a possible explanation, starting with a description of the regularity, followed by an examination of the characteristics of the context under investigation. The relevance of discovered structures or mechanisms can then be tested in order to establish which may be responsible for observed regularities. The discovery of structures and mechanisms is the central challenge for the retroductive strategy, requiring creativity, intuition and guesswork on part of the researcher (Blaikie, 2010).

The abductive logic

The abductive logic of enquiry is similar to the retroductive logic in that it is founded on the depth realist ontology and a neo-realist epistemology. However, an interpretivist paradigm underpins this research strategy, which aims to construct theories derived from social actors' language, meanings and accounts in the context of their everyday lives (Blaikie, 2010).

Research usually begins by describing the activities and meanings of social actors from which categories and concepts can be derived, forming the basis for understanding the phenomenon at hand. The researcher's goal is to discover and describe the 'insider's' perspective and avoid imposing their 'outsider' view. In doing so the aim is to discover why people do what they do through uncovering the tacit, mutual knowledge held among social actors in the social world under investigation. According to Blaikie (2010) the abductive research strategy has a number of guiding principles (Figure 16):

Principles of the Abductive research strategy
1. The basic access to any social world is through the accounts that people can give of their own actions and the actions of others. 2. These accounts are provided to the social scientist in the language of the participants and contain the concepts that the participants use to structure their world, the meanings of these concepts, and the 'theories' that they use to account for what goes on. 3. However, much of the activity of social life is routine and is conducted in a taken-for-granted, unreflective manner. 4. It is only when enquiries are made about their behaviour by others (such as social scientists) of when social life is disrupted, and/or ceases to be predictable, that social actors are forced to consciously search for or construct meanings and interpretations. 5. Therefore, the social scientist may have to resort to procedures that encourage this reflection in order to discover the meanings and theories. 6. Ultimately, it is necessary to piece together the fragments of meaning that are available from their externalised products.

Figure 16: Principles of the Abductive research strategy (Blaikie 2010, pp. 91-92).

In the Abductive strategy theory, development can occur through the description of social actors' lives and/or the deriving of categories and concepts from which an understanding is developed.

> *Regularities that are discovered at the beginning or in the course of the research will stimulate the researcher to ask questions and look for further answers. The data will be reinterpreted in the light of emerging theoretical idea, and this may lead to further questioning, the entertainment of tentative hypothesis, and a search for answers. Research becomes a dialogue between data and theory mediated by the researcher* (Blaikie, 2010, p. 156).

This form of theory development follows an interpretive process which continues until theoretical saturation is achieved and an explanation emerges. This may involve periods of immersion in the social world and periods of withdrawal and reflection.

3.6. Summary

This part of Chapter 3 presents a summary of the chapter. This chapter has presented the thesis methodology in four main parts. Part 3.2 has presented the mixed methods research approach, it has discussed what is meant by a mixed methods approach to research, how to purposefully mix methods and choose a mixed methods design. Part 3.3 of this chapter has presented the sequential emergent multiphase mixed methods research design adopted by this thesis. Part 3.4 has presented paradigms in research, providing a discussion of paradigmatic inconsistencies when mixing methods, the stance of paradigmatic purity, of pragmatism and the dialectic stance. Part 3.5 has presented a discussion of how theory may be included in research, covering the role of theory and the research strategy.

4. Phase One research design

4.1. Introduction

This chapter shall describe the research design for the Phase One study. Before proceeding the study received ethical approval from the Tasmania Social Sciences Human Research Ethics Committee (HREC) at the University of Tasmania [Ethics reference H0011913]. The chapter is presented in four parts. Part two provides background information supporting the Phase One study. Part three presents the methods of data collection employed. Part four presents appropriate data analysis techniques. Part five presents procedures and processes followed for conducting the study.

- Part 4.2 provides a background to the study, covering the aims and research questions, paradigmatic assumptions and the profiles of participants.
- Part 4.3 presents the methods for data collection that include the focus group technique and Multiple Sort Procedure (MSP).
- Part 4.4 presents the techniques for data analysis, these include Thick Description and the multidimensional analysis technique of Correspondence Analysis.
- Part 4.5 presents the procedures and processes which were employed to guide the study.

4.2. Background

This part of Chapter 4 presents background information supporting the Phase One study, and it is presented in three sections. Section 4.2.1 presents the aim along with supporting research questions; section 4.2.2 presents the philosophical assumptions which underpin the study, and section 4.2.3 presents a description of the participants recruited for the study.

4.2.1. Aims

This section presents the aims and research questions which guided the Phase One study. The study aim was to explore the use of Information and Communication Technology (ICT) by international students in interactions with important people in their lives at different stages of their sojourn. This first study was guided by several Research Questions (RQs) arising from the initial research problem and the questions were as follows:

- **RQ1:** To what extent are ICTs used by international students in their communication practices while on sojourn?
- **RQ2:** What are the *modes* and *means* of communication associated with certain practices?
- **RQ3:** Why are certain ICTs used or not used?
- **RQ4:** To what extent does ICT use change while on sojourn?

4.2.2. Paradigmatic assumptions

This section provides an articulation of the philosophical assumptions which underpin the Phase One study's research design. The research paradigm is that of interpretivism, which views social reality as the product of its inhabitants, a social world that is already interpreted by the meanings that individuals produce and reproduce together during the course of their everyday lives (Blaikie, 2007, p. 131). Knowing these interpretations through the meanings attributed by individual social actors (people) is then an important focus for the researcher.

The study has been designed to explore the use of ICTs during the everyday lives of international students on sojourn in Tasmania, Australia. Drawing on models of the acculturation process and the appropriation of technology, the experience of individual students and their situations is considered to be an appropriate means by which the use of ICT while on sojourn can be known and understood by the researcher.

Following Blaikie's classification of research paradigms the research design is likely founded on an idealist ontological position with a social constructionist epistemology. An idealist ontology views the external world as consisting of representations that are the creation of individual minds and social reality as consisting of the shared interpretations that social actors (people) produce and reproduce as they go about their everyday lives (Blaikie, 2007, p. 17). Social constructionism is a branch of constructionism focused on the collective generation and transmission of meaning. This epistemology takes the position that all meaningful reality is socially constructed and according to Crotty 'the "social" in social constructionism is about the mode of meaning generation and not about the kind of object that has meaning' (Crotty, 1998, p. 55); objects are not limited to only 'social' objects (i.e. persons) but all objects natural and social (Crotty, 1998).

Based on this paradigmatic position the research strategy of this exploratory study is then an abductive one according to Blaikie's classification (Blaikie, 2010, p. 105). The abductive research strategy proposed by Blaikie is developed around the idea of adaptive theory development proposed by Layder (1998). The focus is on an iterative research process, which privileges the accounts that people give of their own activities and those of others. Research work involves constructing theories that are derived from social actors' language, meanings and accounts in the context of everyday activities. This is a 'bottom up' approach that seeks to reduce the researchers' privileged position and bring forward the social actors. Research begins by describing activities and meanings, then deriving categories and concepts that can form the basis of an understanding of the research problem. Six principles which underpin the abductive process described by Blaikie are presented in Figure 16.

In this way, abduction is a process in which a researcher gathers and assembles lay accounts of a phenomenon and then iteratively constructs their own account through periods of immersion in the social world followed by withdrawal for reflection, analysis and theory development (Blaikie, 2010, p. 156).

4.2.3. Participants

This section presents the participant profile of people recruited for the Phase One study. The study participants were international students enrolled at the University of Tasmania (UTAS), as the University is responsible for one of the largest population of international students in Tasmania. Participants needed to be in their first year of study at UTAS, so that their experiences of arrival and previous travel were still relatively fresh in mind. Students in diasporas and those who arrived under circumstances other than pursing tertiary education were outside the scope of the study.

The study targeted three different nationality groups, international students from: mainland China, South Korea and Saudi Arabia. These three nationality groups were chosen to provide cultural diversity to the study as practices may vary between cultural groups (Srinivasan & Pyati, 2007) and to take into account the influence that different nationalities and cultures may have on the use of ICT (Conradson & Latham, 2005). Students from mainland China make up the highest proportion of international students studying at UTAS, students from South Korea are known through other studies to use a range of ICT (Collins, 2009) and

students from Saudi Arabia were chosen to provide a cultural contrast to the other two nationalities.

4.3. Data collection

This part of Chapter 4 presents the methods of data collection employed by the Phase One study, and they are presented in two sections. Section 4.3.1 presents the focus group technique, and section 4.3.2 presents the Multiple Sort Procedure (MSP).

4.3.1. The focus group technique

This section presents the focus group technique. Focus groups are a critical part of qualitative research practice, they offer both practical and theoretical benefits that are distinct from the individual interview. While they may appear deceptively simple, focus groups are efficient tools for conducting empirical research. A focus group with even a small number of participants may generate large quantities of materials in a short period of time while engaging the multiple participants all at once (Barbour, 2007).

Focus groups may be pre-existing, like families, or brought together based on some criteria. Groups are normally homogenous consisting of people sharing the same criteria. Groups may meet only once, or have multiple meetings over a period of time. Multiple groups may also be engaged, with as few as two participants or as many as twelve or more (Barbour, 2007).

A focus group will facilitate discussion among its participants by following a schedule with topics or questions to discuss, with the researcher acting as facilitator guiding the group discussion. This facilitated interaction between participants is a key feature which sets focus groups apart from other interviewing techniques. By facilitating a more natural form of conversation between people, focus groups allow a researcher to explore social discourse in ways that are not possible through individual interviews or observations (Kamberelis & Dimitriadis, 2011; Wilkinson, 2004).

The interaction possible in focus groups supports the making of collective meaning and social practice and facilitates the exploration of collective memories and shared stocks of knowledge about everyday life.

> *Focus groups afford researchers access to the kinds of social interactional dynamics that produce particular memories, positions, ideologies, practices and desires among specific groups of people* (Kamberelis & Dimitriadis, 2011, p. 903).

Focus groups explore people's opinions, attitudes, beliefs, values and understanding of things. According to Millward (2000) two interrelated kinds of 'evidence' can be derived from focus groups: 'the group process (the way in which people interact and communicate with each other) and the content around which the group process is organised (the focal stimulus and the issues arising from it)' (Millward, 2000, p. 306).

For this study the focus group technique was appropriate for facilitating discussions on questions of interest to the researcher, putting them in a format where the participants – international students – could give the researcher guidance and direct the focus of inquiry towards topics of importance and interest to them, which related to the questions at hand. This approach intended to empower participants to direct the conversation and that was sensitive to the context surrounding their individual experiences.

This application is consistent with the particular strengths inherent in the focus group technique, by 'working with' participants 'focus groups can be used strategically to subvert the authority of researchers and to allow participants to "take over" and "own" the interview space' (Kamberelis & Dimitriadis, 2011, p. 903). The focus group technique supports deliberative, dialogic and democratic research practice, allowing the researcher to work with participants not on them. They facilitate the democratisation of the research process promoting dialogic interactions and joint co-construction of knowledge through interaction.

The focus group technique is also a flexible one, it can be used as a standalone method or combined with other techniques suitable for mixed or multimethod studies. Stimulus such as video, images, media or other objects may also be introduced to groups either along with questions or instead of them. Groups may also be asked to undertake activities such as sorting cards, drawing mind maps or ranking exercises.

4.3.2. Multiple Sort Procedure (MSP)

This section presents the Multiple Sort Procedure (MSP). The MSP is a technique that focuses on the importance of personal meaning, which enables an understanding to be gained of how people conceptualise a particular area and the constructs and categories that they use.

Generally MSP involves individuals or a group of people sorting elements (cards with labels, pictures, photographs etc.) representing an area of interest into different categories. Ideally 15 to 25 elements will be used for sorting, but beyond this the degree of constraint and the sort can vary greatly. Generally two kinds of sorting procedures are common – Free sort and Structured sort (Barnett, 2004).

- **Free sort:** Participants can choose the basis of the sort and within that are free to allocate the elements to categories in any way they choose.
- **Structured sort:** The researcher may want participants to sort the cards in a certain way, for instance using pre-defined response categories.

A sort recording scheme can be followed to capture details of a sort for analysis. A scheme normally involves firstly recording a description of the category scheme (the sort), secondly the groupings of the sort and thirdly creating labels for each of the groups within the sort (Barnett, 2004, pp. 294–295). When included as a focus group exercise MSP can add a brainstorming element to focus group discussions, which can help facilitate discussion and reflexivity by participants. For example, in the Phase One study participants were asked to think about how they communicated while on sojourn and to write the ways they communicated with 'important people including friends and family' down on coloured cards. The cards generated then acted as prompts to facilitate discussion, with participants asked to sort, interpret and analyse what they had written down.

Analysis of the recorded data focuses on the similarities and differences between elements. Content analysis can be used with a free sort to analyse the descriptors or sort themes. Themes and category schemes can be organised into tables for each sort showing the ways in which they were used by different groups; sorts can be compared and contrasted to see how they relate to one another and the relationships among cards can be explored. This more complex analysis can be done using multidimensional scaling techniques and visual representation. To examine the relationships among cards, data can be converted into a matrix for analysis where cards represent rows, sorts as columns and cells as the group that a card was assigned to. The matrix can also be varied so that when plotted the points represent participants rather than cards.

Elements	Sort 1	Sort 2	Sort 3
A	1	1	1
B	2	1	3
C	3	2	1
[Groups e.g.]: 1[agree], 2[neutral], 3[disagree]			

Figure 17: Example MSP result

The matrix in Figure 17 can be converted into a contingency table and analysed using multidimensional scaling techniques such as a Scalogram analysis or Correspondence Analysis, depending on the nature of the response categories (Barnett, 2004).

4.4. Data analysis

This part of Chapter 4 presents the approaches towards data analysis in two sections. Section 4.4.1 presents the technique of Thick Description used to capture accounts of participants from the focus group conversations. Section 4.4.2 presents a description of multidimensional analysis and the technique known as Correspondence Analysis.

4.4.1. Thick Description and participant reflexivity

This section presents the method of Thick Description. In his work *The Interpretation Of Cultures* Geertz (1973) defines the method of thick description from an anthropological perspective ‘as ethnography’ and says that the ethnographer's challenge is to read and construct a reading of ‘a multiplicity of complex conceptual structures, many of them superimposed upon or knotted into one another, which are at once strange, irregular, and inexplicit’ (p. 10) which arise from interviewing, observation, field work and all activities of the ethnographer. The writings of an anthropologist are then second and third order interpretations ‘– fictions in the sense that they are “something made”, “something fashioned”’ not something false or un-factual’ (p. 15).

A thick description is both a biographical and interactional writing technique, it involves capturing and representing the meanings which a particular action or sequence of actions has for an individual in question. The thick description technique is used by a researcher to represent individual participants and their unique experiences and situations. The technique allows the lived experience of individuals to be presented and represented in the research (Denzin 2001). According to Denzin (2001) this form of analysis has a phenomenological orientation. It is intended to allow a reader to naturalistically generalise his or her experiences to those presented, creating verisimilitude, a space where the reader can imagine his or her way of life into the life of the other. The individual experiences may be captured through the use of any available methods, including interviews, observation, field work and many others.

4.4.2. Multidimensional analysis of qualitative data

This section presents the technique of Multidimensional Analysis (MDA) and the method of Correspondence Analysis (CA) – as one kind of MDA. An MDA approach to qualitative data allows a researcher to look at the relationship between variables, and the way that they overlap, this approach is also referred to as multivariate analysis. Multivariate analysis is when the relationship between multiple (commonly 3 or more) variables are examined in multivariate data. Numerous techniques exist to analyse multivariate data, and their applicability will depend on the researcher's objectives and the kinds of data involved. Multidimensional methods may be categorised under the following headings: (1) Predicting outcomes, (2) examining differences between groups, (3) exploring underlying structure and (4) fitting our measurements to theoretical models (M. Wilson & Hammond, 2000).

Here the objective is to explore the data's underlying structure, in line with the objectives of the Multiple Sort Procedure (MSP) where following description of the sort data, multidimensional analysis can be used to see how the sort data relate to each other and examine the relationships among cards, terms and even respondents (Barnett, 2004, p. 295). To analyse data from the MSP, Barnett (2004) demonstrates the use of Multidimensional Scalogram Analysis (MSA) a statistical technique which can examine the structure of qualitative data. MSA is one among a number of techniques known as Correspondence Analysis (CA), a technique which has been reinvented numerous times under different labels since first being demonstrated in a paper by Fisher in 1940, and later by Guttman in 1941 (Weller & Romney, 1990).

CA is a multidimensional scaling technique for the analysis of multivariate data, and CA shares its underlying (fundamental) mathematical structure with a number of other well-known and widely used techniques including Principal Component Analysis (PCA) and Analysis of Variance (ANOVA) (Weller & Romney, 1990). According to Weller & Romney (1990) these 'metric' scaling techniques are generally related because they consistently follow three steps:

1. the original 'data' are transformed by some normalisation of transformation procedures;
2. a singular value decomposition of the transformed data summarises the basic structure in the data with a set of row creators, a set of column vectors, and a set of 'singular values';
3. the sets of row and column vectors may be rescaled or otherwise weighted to provide a final set of row and column scores.

Through this shared mathematical structure, techniques including CA, ANOVA and PCA are related, but each technique takes its own approaches towards these three steps.

Correspondence Analysis (CA)

This section introduced the technique of Correspondence Analysis (CA). CA is a geometric (descriptive) technique for inductive data analysis – moving from the particular to the general. It falls into a class of multivariate statistical methods for dimension reduction based on singular value decomposition (SVD), and the idea behind CA is to reduce the dimensionality of a data matrix and visualise it in a low dimensional subspace of two or three dimensions (Greenacre, 1984).

CA follows a series of well-defined steps starting with the coding of a data matrix **N** which must contain suitable data; that is, data on the same scale such as tables of counts, ratio-scale data or compositional data like proportions of percentages with contest sums, or binary data (1/0s) may be used. The data is then converted into a two-way contingency table using the Chi^2 (X^2) technique creating a correlations matrix. It is worth noting that 'standard' CA only works with bi-variate data, where two categorical variables are compared. Multiple CA (MCA), an extended version of CA, is generalised to three or more categorical variables (dimensions) and should be used in this case (Nenadic & Greenacre, 2007).

A data matrix **N** may then be pre-processed in some way, usually by centring or recoding the data to arrive at matrix **A**. The steps for applying CA to data matrix are – the matrix **A** (i x j), a two-way contingency table of frequency counts, is firstly: (1) transformed by dividing each cell in the matrix by the square root of the corresponding row and column totals (least squares solution), (2) then decomposed with a SVD to create a set of row and column vectors with singular values, and (3) these vectors are then rescaled with the original totals to obtain 'optimal scores', a technique known as optimal scaling. The following example is based on the PCA framework followed by Greenacre (Greenacre, 1984, 2010) and implemented in the R statistical software package extension 'ca' (Nenadic & Greenacre, 2007); it is one of various multidimensional techniques defined in terms of how it applies SVD, and the process described by Nenadic and Greenacre (2007) is summarised here:

1. Transform the matrix $\mathbf{S} = \mathbf{D}_r^{-1/2}(\mathbf{P} - \mathbf{r}\mathbf{c}^T)\mathbf{D}_c^{-1/2}$ where:
    a. The correspondence matrix $\mathbf{P} = \mathbf{A}/n$ or $\mathbf{P} = (1 / \sum_i \sum_j n_{ij})\mathbf{A}$ i.e. the contingency table **A** (I x J) divided by its sum **n**,
    b. with row and column masses $\mathbf{r} = \mathbf{P1}$ and $\mathbf{c} = \mathbf{P}^T\mathbf{1}$ which are vectors representing the row and column marginal totals of **P,** where $\mathbf{D}_r^{-1}\mathbf{P}$ is the row profile and $\mathbf{D}_c^{-1}\mathbf{P}^T$ is the column profile (written as a row),
    c. $\mathbf{D}_r$ and $\mathbf{D}_c$ are the diagonal matrixes of row and column sums respectively of **P**
2. Calculate the SVD: $\mathbf{S} = \mathbf{U}\mathbf{D}_\alpha\mathbf{V}^T$
3. Rescale the scores: $\mathbf{F} = \mathbf{D}_r^{-1/2}\mathbf{U}\mathbf{D}_\alpha$ (principal row coordinates) and $\mathbf{G} = \mathbf{D}_c^{-1/2}\mathbf{V}\mathbf{D}_\alpha$ (principal column coordinates).

To find the row or column positions for unit vectors in the projected space (on the plot), the values are the principal coordinates (3) without the scaling. Standard row coordinates are: $\Phi = \mathbf{D}_r^{-1/2}\mathbf{U}$ and standard column coordinates are: $\mathrm{r} = \mathbf{D}_c^{-1/2}\mathbf{V}$ (Nenadic & Greenacre, 2007)**.**

From a practical point of view CA is used to transform a contingency table into a graphical-geometric representation. To do so, a three step analytical process is performed for each variable and associated set of categories: (1) categorical profiles are calculated (as relative frequencies or conditional proportions) and masses (marginal proportions); (2) the distance between points is calculated, and (3) an ***n***-dimensional space is sought which best fits the points (Clausen, 1998).

Analysis may start with the transformation of frequencies in a contingency table into sample probability densities, or profiles as they are called in CA. According to Greenacre (1984) 'Profiles are vectors of relative frequencies – frequencies relative to the respective totals' (1984, p. 60). This process produces a set of row and column profiles as shown in Table 53, and the average of a row profile is the profile of the 'marginal' distribution of the column variable (the sort), also known as 'masses'. Masses measure the importance of a particular profile to the analysis: 'masses assigned to the profiles are relative masses – masses relative to the total mass' (1984, p. 60). Row masses equal the average column profile, and column masses equal the average row profile.

The average row profile is the 'weighted' average of the row profiles, known as the 'centroid'. This profile is placed at the origin of the principal axes of the graph; the more distinct a profile is in comparison to the centroid, the further away it will lie from the origin, and if all profiles are equal, all points on the graph will fall within the centroid. So, if two row points lie close together on a graph their profiles will be similar and those with profiles similar to the centroid will lie closer to the centre. The inter-point distance can be calculated using a chi-square distance – a weighted Euclidean distance where the weight is the inverse of the respective average profile (Clausen, 1998). This is represented by the function:

$$d(i,i') = \sqrt{\sum_j \frac{(a_{ij} - a_{i'j})^2}{a_j}}$$

Where $d(i,i')$ is the chi-square distance between points i and i' and a_{ij} are elements in the row profile, and a_j are elements in the average row profile. Using an example from data in Table 54, the distance between the terms, for example 'email' and 'face to face' (rows 4 and 5 respectively), can be calculated as follows:

$$d(4,5) = \sqrt{\frac{(0.375 - 0.214)^2}{0.476} + \frac{(0.313 - 0.286)^2}{0.262} + \frac{(0.313 - 0.5)^2}{0.262}}$$

$$d(4,5) = \sqrt{0.1905}$$

$$d(4,5) = 0.4364$$

In this way the distances between terms is defined, including the distance between a point and the centroid where ***i'*** is the average row or column profile. A notable consequence of using the chi-square distance is that categories with less observations contribute relatively more to the inter-point distances than those with more. Another important point is that this is not calculating the distance between rows and columns, i.e. different sets of points (Clausen, 1998).

Once the distances for rows and columns are calculated and the distances of points to the centroid is known the next step is to find the axis in the ***n***-dimensional space that lies closest to all the points and plot the points in a two-dimensional space. To achieve this the axis is rotated and the weighted sum of the square distances $\boldsymbol{z}^2$ is used to measure the distance of points to the axis with the intent of minimising the function $\sum rz^2$ where the weights are the row masses ***r***. In this case Principal Component Analysis (PCA) is used to find the solution. For analytical purposes, this means that descriptive statistics related to PCA may also be used for analysis in addition to the CA graph. The extent to which profile points are spread around the centroid is measured by the total inertia (also known as variance) related to the chi-square distances (Clausen, 1998), defined as the function:

$$\Lambda^2 = \sum_i r_i d_i^2$$

Where $\boldsymbol{d_i}$ is point ***i***'s chi-square distance from the centroid and $\boldsymbol{r_i}$ is the point is mass (weight). Total inertia is also related to Pearson's chi-square statistic and in this way CA is also a technique for decomposing what is known as Pearson's phi-square or 'deviation from independence' for a frequency table. This is achieved by decomposing the total inertia into a set of eigenvalues. These may further be turned into singular values – the square root of the eigenvalue, for singular value decomposition (SVD) (Clausen, 1998).

Coordinates calculated using SVD provide information about the position of points in relation to dimensions of the plain. Coordinates represent a decomposition of $\boldsymbol{d^2}$ 'the squared chi-square distance to the origin', and since $\boldsymbol{d^2}$ is used to calculate total inertia similarly coordinates of points can be used to find the eigenvalues for each dimension (Clausen, 1998).

But in this process the distance between different sets of points (i.e. terms and sorts) is not explicitly defined and the interpretation of the relationship between different point clouds

requires more complex analysis. Due to the complex relationship between point clouds, points, dimensions and inertia, the *contribution of points to the inertia of dimensions* (the absolute contributions) and the *contribution of dimensions to the inertia of points* (the squared correlations) need to be analysed to achieve a full interpretation of CA results (Clausen, 1998; Greenacre, 1984).

The contribution of points to the inertia of dimensions is described as the proportion inertia of a particular dimension that is explained by a point, and points with large contributions are important for determining the direction of the dimension concerned. The contribution of dimensions to points 'indicates how well the point is described by the dimension concerned'. Points situated in the direction of the axis imply a high correlation with the associated dimension. The sum of squared correlations provides a measure for the goodness-of-fit of each points representation in the solution and is used to explain the inertia for a given point (Clausen, 1998). Even though the distance and coordinates are calculated separately for each dimension, sets of points presented in a joint space (i.e. the graph) are still related in a number of ways (Clausen, 1998, p. 20):

- The space for the rows and the space for the columns have the same dimensionality.
- Eigenvalues are the same for the two solutions.
- The coordinates of the row points can be calculated on the basis of the row profiles and the coordinates of the column points, and vice versa for the other sets of points.

In this way 'the configuration of a particular set of points reflects similarities and differences within the set, whereas the joint configuration indicates correspondence between the two sets of points' (Clausen, 1998, p. 20). For sets of points it is appropriate to interpret a point's relative position in relation to all points in another set, but not between individual points.

4.5. Study procedures and process

This part of Chapter 4 presents the procedures adopted for conducting the Phase One study, and it is presented in two sections. Section 4.5.1 presents procedures for recruiting focus group participants and the process followed, and section 4.5.2 then presents the procedures and the process followed when conducting the focus group discussions.

4.5.1. Participant recruitment

This section presents the procedures followed when recruiting focus group participants. Twenty-four (24) international students enrolled at the University of Tasmania during the study were recruited through advertisements placed in a print newsletter and email advertisements. Advertisements were distributed by the University of Tasmania international student services department and by the Tasmanian University Union (TUU) Sports and Societies councils to affiliated student clubs and societies.

At the scheduled sessions, fewer participants turned up than were expected and only 9 of the 24 recruited participated in the focus group discussions as shown in Table 13. In Group A, a participant decided to bring along a friend (a fellow international student in their first year of study) who met the recruitment criteria, and due to low numbers on the day the decision was made to let them participate – but this created a mixed gender group.

Group	Nationality	Registered	Attended
A	South Korean (mixed gender)	4	2
B	Mainland China (male)	5	3
C	Mainland China (female)	10	3
D	Saudi Arabia (male)	5	1

Table 13: Phase One participants recruited

4.5.2. Focus group sessions

This section presents the procedures and process followed for conducting the four focus group sessions with groups of recruited students A –D as shown in Table 13. As the study's purpose was exploratory in nature and of qualitative design these smaller than expected groups were not seen as a significant issue, and subsequently the four focus group sessions were held over two days on the 13th and 14th of September 2011.

Focus group discussions were held in a large meeting room around a rectangular table facing a white board. Food and refreshments were provided to participants who attended as an incentive for their participation. The researcher served as the moderator for the sessions, which ran for an average of 45 minutes each. A focus group session started with the moderator providing an introduction to the research, along with handing out information sheets and ethics consent forms. Students were asked if they had previously read them (copies had been made available to participants prior to the sessions) and participants were given an opportunity to ask any questions before the session began and were notified that the sessions would be audio recorded.

A focus group session facilitated discussion about their participants' experience of three stages of their sojourn, starting at the present moment and their everyday life (Here), then stepping backwards to when the students arrived in Australia (Arrival), and then to before they departed from their home country (Home). These steps form a metaphor for the journey (sojourn) of an international student. The metaphor of a journey is derived from the adjustment process associated with acculturation (Smith & Khawaja, 2011) and the settlement process as it relates to immigrants' need for information (Mwarigha, 2004). Rather than reinforcing a dichotomy between Home and Here (Collins, 2009), the intention was to promote the idea of a journey from Home, to Tasmania (Arrival) that was still unfolding (Here) and that had the potential for the participant to return Home (as international students often do while on sojourn).

The Multiple Sort Procedure (MSP) was followed to facilitate discussion and a card sort exercise was conducted for each of the three journey stages: Here, Arrival and Home. Participants were each provided with three piles of coloured cards (green, yellow, and orange), one colour for each of the three stages of their sojourn in that order and a whiteboard marker. The discussion of each stage then proceeded in turn with the moderator asking participants to think about their communication with important people in their lives, and write down on their cards the different ways they communicated with them (as many as they could). Participants were reminded they could ask any questions if need be and that these cards would be used to facilitate discussion and help the moderator understand what they were talking about.

Once the different ways of communicating were written down for a sort, cards were collected and placed on a whiteboard in the room. The focus group was then involved in a process of organizing cards into related groupings. Discussion focused on the analysis of card groupings, and participants were asked to explain how and why cards had been grouped in certain ways. Participants took turns explaining and describing the groupings, what they had written and why it was important to them. The cards generated by participants in the MSP were kept for further analysis following the conclusion of data collection.

4.6. Summary

This part of Chapter 4 presents a summary of the chapter. The chapter has presented the Phase One study research design in four parts. Part 4.2 provided background to the study, presenting the study's aims and research questions, the paradigmatic assumptions underpinning the study and the profile of research participants. Part 4.3 presented the methods of data collection, which included the focus group technique and the Multiple Sort Procedure (MSP). Part 4.4 presented the techniques for data analysis, these included Thick Description and the multidimensional analysis technique of Correspondence Analysis. Part 4.5 presented the procedures and processes which guided the study.

5. Phase One results and discussion

5.1. Introduction

This chapter shall describe the results and present a discussion of results for the Phase One study. The chapter is presented in two parts. Part two presents the results of analysis and part three presents a discussion of the study's results, to address the aim and research questions which guided the Phase One study.

- Part 5.2 presents the results of analysis for the Phase One study.
- Part 5.3 presents a discussion of the results to address the Phase One study aim and research questions.

5.2. Results

This part of Chapter 5 describes results from analysis of the Multiple Sort Procedure (MSP) data and the focus group discussions. The first section 5.2.1 presents an analysis of the MSP data to provide an inter- and cross-group perspective, then section 5.2.2 presents Thick Description of focus group discussions and participant analysis to provide insight into participant and group level conversations facilitated by the MSP.

5.2.1. Analysis of card sort data

This section presents result from analysis of MSP card sort data. The MSP performed by focus group participants generated a data set of cards, listing modes and means of communication (terms) which participants utilised to communicate with important people (friends, family and acquaintances) in their lives during three stages of their sojourn. This procedure means that cards were organised into three categories: (1) Here (2) Arrival (3) Home; i.e. this included those technologies used at Here (Sort 1), on Arrival (Sort 2) and when living at Home – before the participant went on sojourn (Sort 3).

The modes and means of communication written on cards by participants were transcribed into a spreadsheet and their frequencies counted. Table 55 lists the items written on cards, their raw frequency counts and proportions across the four focus groups A to D. In their raw form, the cards present a heterogeneous collection of the modes and means of communication considered important by participants in the groups, but when organised into sort categories (Sort 1, Sort 2 and Sort 3) and compared, similarities clearly become visible across the

groups and the sorts. It should be noted that participants did not discuss the cards while writing on them, but that once written down the raw terms for each sort were organised by the focus group to form conceptual groupings of like terms, the results of which are discussed in section 5.2.2. analysis of MSP data. This section focuses on exploring the relationships between raw terms, which represent the ICTs used by participants for communication while on sojourn. The purpose of this analysis is to understand the association between terms and the sojourn experience.

To look at the patterns across focus groups a second table, Table 52 counts the frequency of unique terms mentioned for each of the three sorts and the ratio (proportion) of terms in each of the sorts and Figure 18 presents the frequencies as a histogram for visual comparison. To further investigate the relationship between categories of terms and sorts the Correspondence Analysis (CA) technique was applied to data in Table 52 to map sort categories (Sort 1) Home, (Sort 2) Arrival, (Sort 3) Here and terms – and terms to a joint plot (Figure 19). Analyses were performed using the R statistical software (R Core Team, 2016) and the 'ca' package for Correspondence Analysis (Nenadic & Greenacre, 2007).

Correspondence Analysis

Correspondence Analysis (CA)generated a scatter plot along a number of dimensions (in this case two: dimension one and dimension two). Sort categories and terms were mapped to the plot jointly and positioned along those two dimensions. Terms were mapped to the plane in relation to one another as were sorts, but individual terms did not influence the placement of sorts and vice versa. This means that the placement of sort categories and terms must be evaluated separately. To explore how points (terms and sorts) are positioned on the plot a number of characteristics can be analysed to provide a robust description. Functions in the R package 'CAinterprTools' were used to visualise important characteristics of Correspondence Analysis (Alberti, 2015). Tabulated results were also recorded; Table 53 lists the relative frequencies between terms (rows) and sorts (columns), and Table 54 lists results from the CA analysis used to generate Figure 19, a joint plot of row and column categories. The plot can be used to understand the relationship between categories; for rows these are 'terms' and for columns they are 'sorts'. Categories (or points) are plotted in relation to one another along multiple dimensions and how they related can be determined based on their proximity to one another and axis or centroid at (0,0). In Figure 19 the term 'communication' is located almost at the centre of the graph, indicating that its profile is very similar to the average row profile

(or centroid). But the relationship between row and column categories cannot be inferred directly from the placement of points on the graph and further analysis is required.

A starting point was to examine the proportion of inertia represented by each dimension, this gives an indication of a dimension's importance. Figure 20, plot (1) displays a bar graph showing the proportion of inertia attributed to dimension one (63.7%) and dimension two (37.3%). This procedure is used to check the number of dimensions which are useful when interpreting the data, and here two dimensions account for 100% of the total inertia and therefore are both useful (Alberti, 2015). To see whether there is a relationship between terms and sorts (one that potentially affects their distribution) the correlation coefficients between rows and columns (the square root of the data set's inertia) is calculated, displayed here as a bar chart in Figure 20, plot (2). The correlation coefficient is 0.643, which indicates that there is a strong positive correlation between rows and columns in the data set. But it must be noted that analysis here is exploratory in nature, the data set is not drawn from a random sample of the international student population. Running Malinvaud's test reveals that dimension one has a *p* value of 0.88 and dimension two of 0.96, indicating that an assumption of independence cannot be rejected (Alberti, 2013).

To better understand dimensions one and two the extent to which a point contributes towards determining the direction of a dimension can be checked by analysing the proportion of inertia for a particular dimension explained by a point. Figure 21 shows the contributions of rows in plot (5) and columns in plot (6) to the direction of dimensions one and two. The unit 'per mills' ($^{0}/_{00}$) is used to describe a row or column's contribution to inertia, the sum of which adds up to 1000, and represents 100% of the total inertia for a dimension. Reference lines on each plot (in red) help to locate points which make important contributions to a given dimension (Alberti, 2015).

Plot (3) presents row categories' contributions to dimensions and it is clear that multiple terms influence the direction of both dimensions, but many overlap which makes it hard to discern the labels. Figure 22 provides two supplementary plots of row categories contributions for dimensions one and two. For dimension one the terms 'face to face' and 'MSN' make the most important contributions, while 'formal meeting' and 'web-mail' make the most important contributions to dimension two. In Figure 21, Plot (4) presents column categories contribution to dimensions; here 'sort 2' has a significant influence on dimension

one, while ‘sort 1’ and ‘sort 3’ both are important in determining the direction of dimension two.

Next it is important to understand how well each point is described by a given dimension. The contribution of dimensions to points is calculated for row and column categories, with dimensions one and two using the square correlations (cos^2) ‘for the angle between the line from the centroid to the point and the principal axes’ (Clausen, 1998). Results are displayed in Figure 23, where Plot 5 shows the correlation of row categories with dimensions one and two. It is clear from the scatter plot that for row categories the terms ‘face to face’ and ‘phone’ have a strong positive correlation with dimension one and that the terms ‘text message’ and mobile have a strong positive correlation with dimension two. Since some terms are overlapping, a supplementary pair of graphs for dimensions one and two are provided in Figure 24. For columns Plot (6) clearly shows that ‘sort 2’ has a strong positive correlation with dimension two and that ‘sort 1’ and ‘sort 3’ both have strong positive correlations with dimension one.

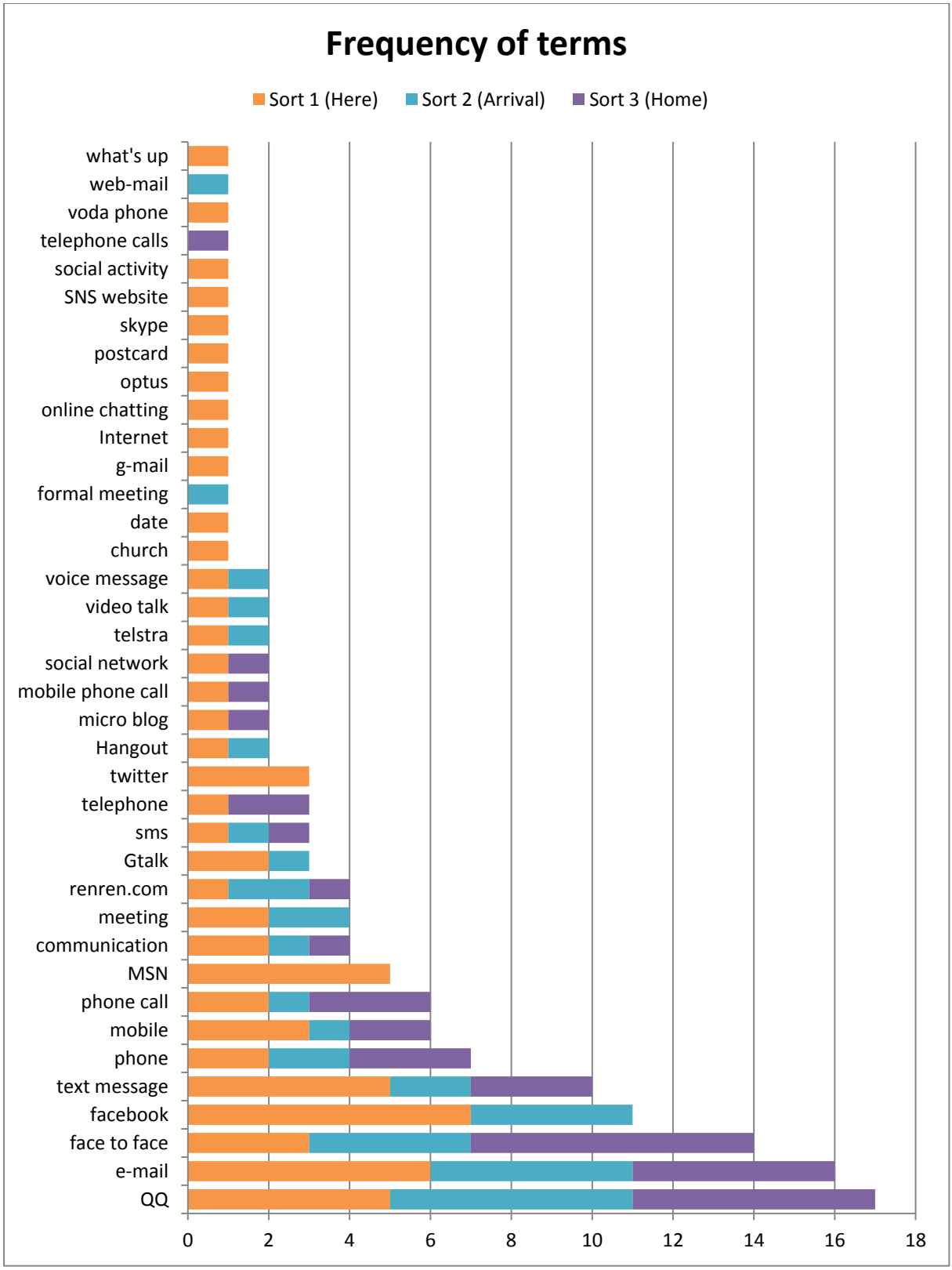


Figure 18: Frequency counts for terms/items by focus group categorised by sort

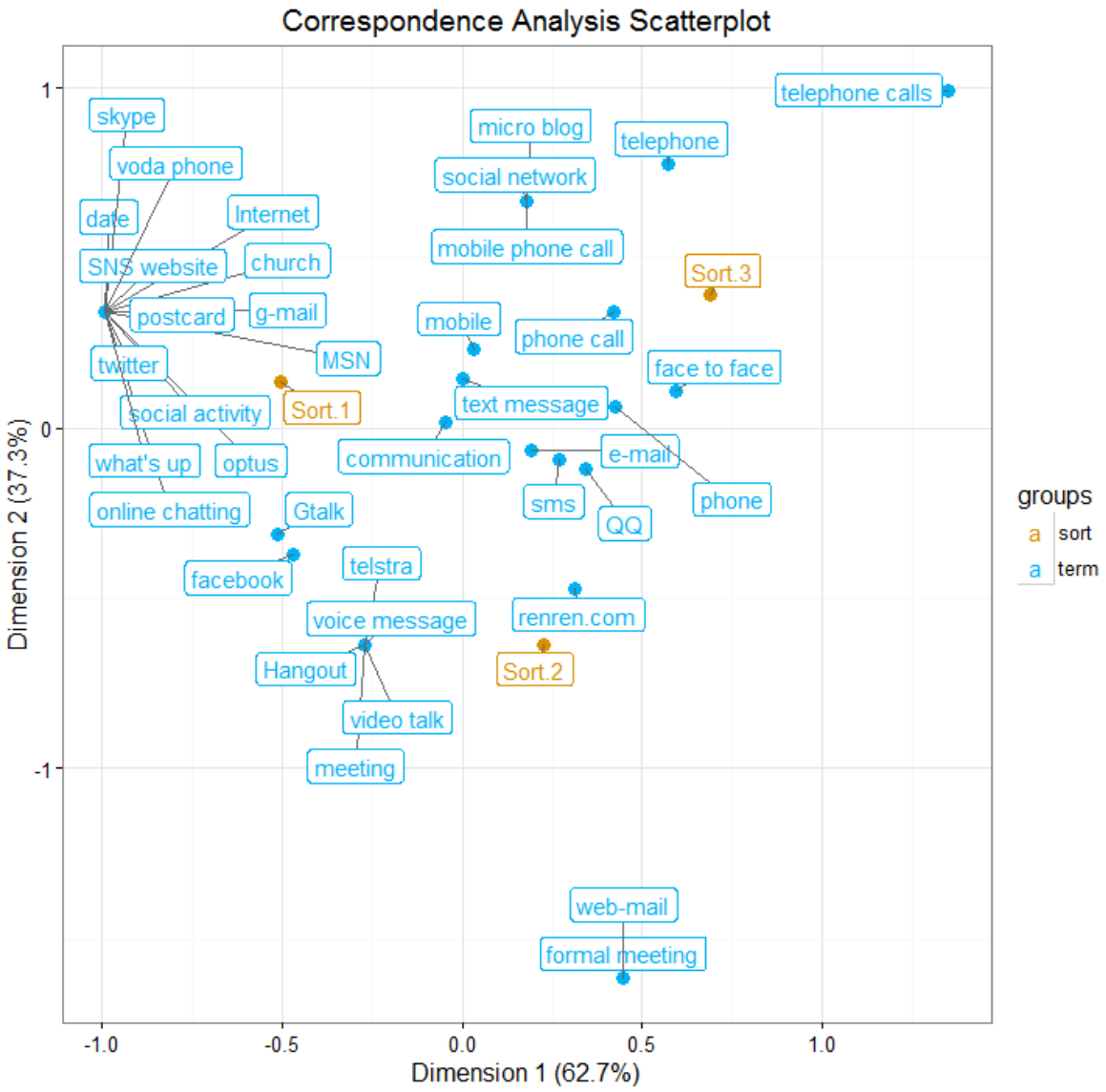
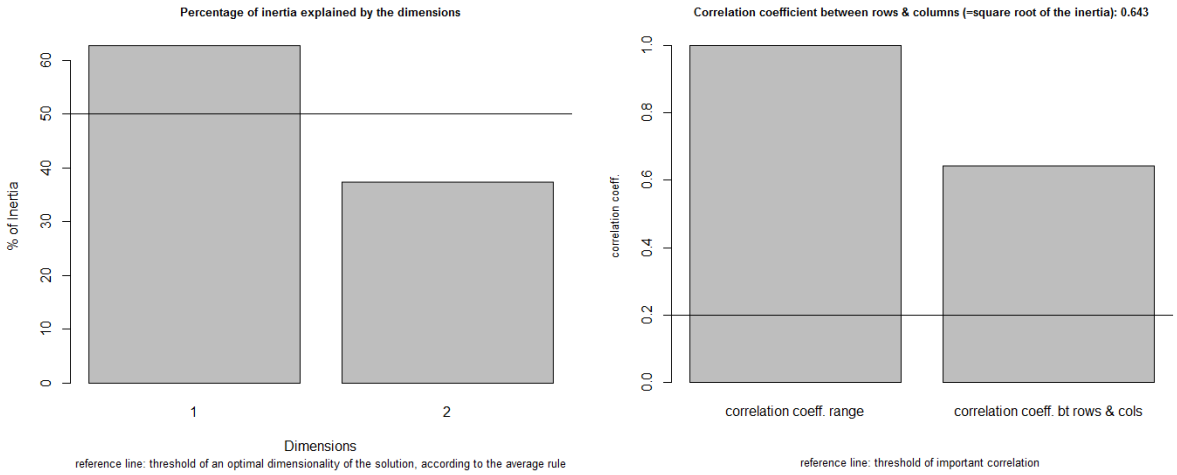
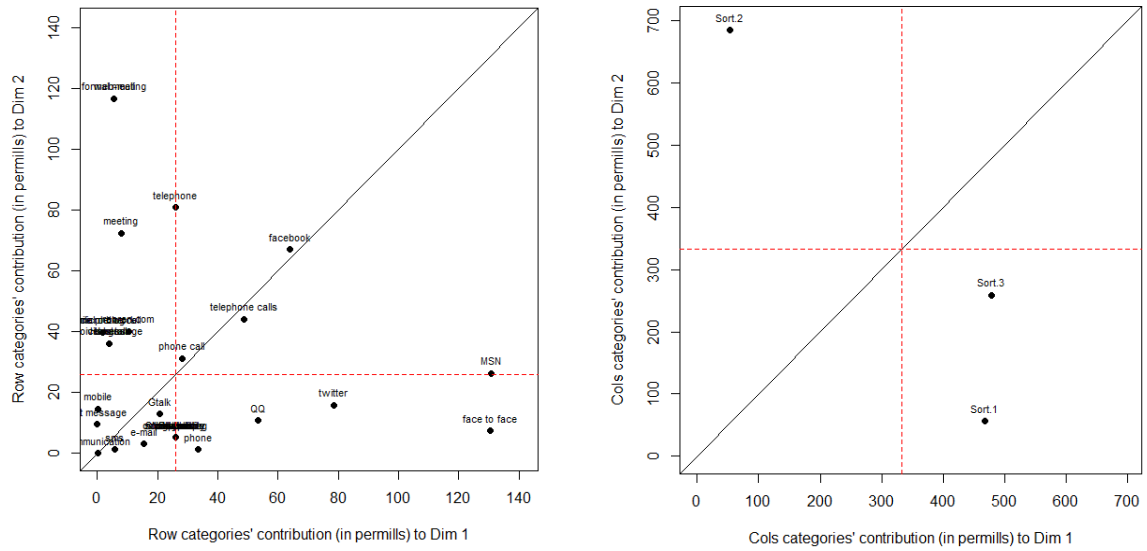


Figure 19: Joint row and column plot for terms and sorts using Correspondence Analysis



(1) The proportion of inertia attributed to each dimension	(2)The correlations coefficient between rows and columns

Figure 20: The proportions of inertia represented by each dimensions (1) and correlation coefficients between rows and columns (2)



(3) Contribution of row categories to dimentions (in permills).	(4) Contribution of column categories to dimentions (in permills).

Figure 21: The contributions of row and column categories to dimensions (in permills)

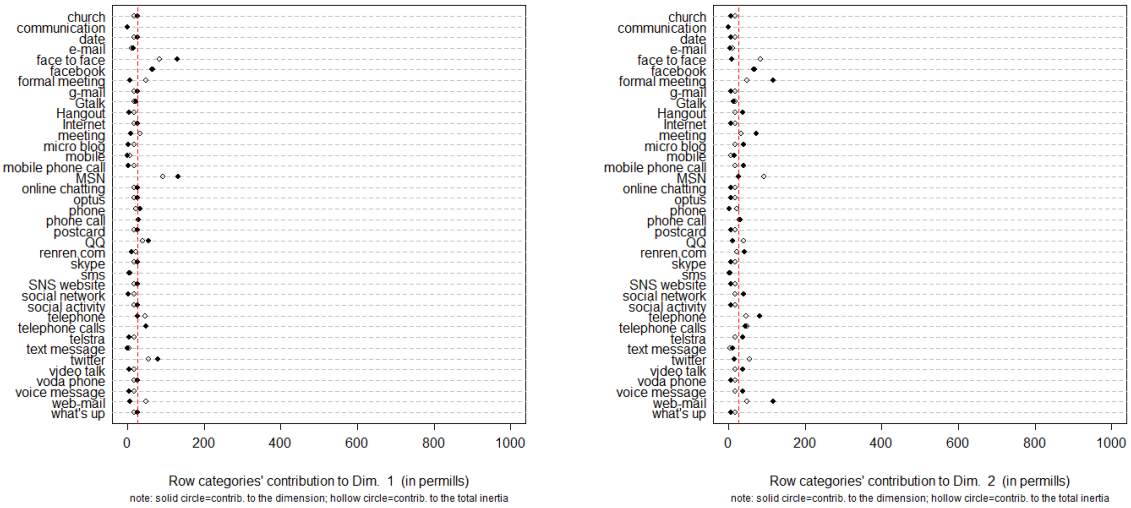
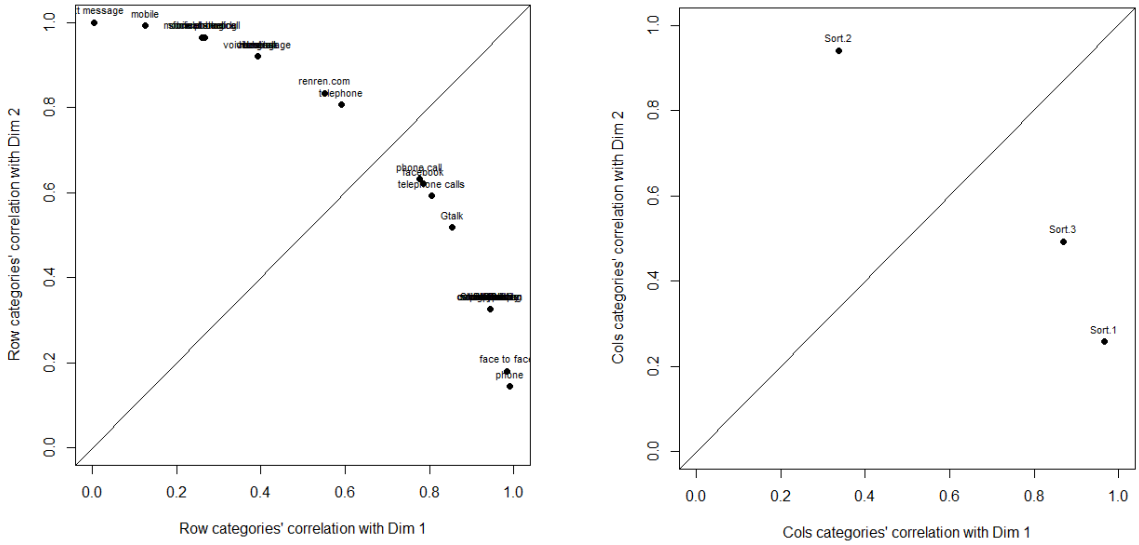


Figure 22: The contribution of row categories to dimensions one (left) and two (right) in permills



(5) Correlation between row categories and dimensions 1 and 2	(6)Correlation between column categories and dimensions 1 and 2

Figure 23: Correlations between dimensions and row and column categories

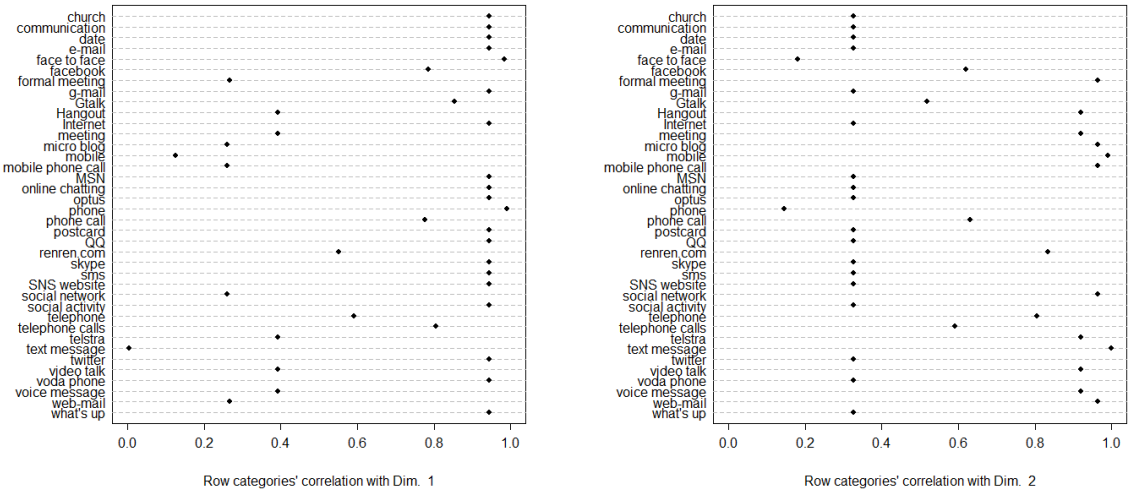


Figure 24: Row category correlations with dimensions one (left) and two (right)

5.2.2. Participant analysis

This section presents thick description of reflective analysis by focus group participants of Multiple Sort Procedure (MSP). Throughout the focus groups several broad themes emerged regarding the modes and means of communication relied upon by international students. The internet, social network sites, communication software, telephones and mobiles, social activity and other modes and means of communication formed six main categories under which the use of ICT could be organised and interpreted along with the focus group conversations.

The Internet

The internet as a means of communication was only written down on a card by one participant, yet many of the means listed by participants required internet access to use. The internet's significance as an enabling technology came through in many of the focus group discussions, being mentioned in relation to using other means of communication.

"When I first arrived here, I'm new here it's my first semester... so I can still remember oh I can't reach the internet because we don't have that in our home, and so I can't use email, QQ, video call. I can use is mobile that I took here from China [so] I use some international service, I order some internet service from China, and it will last for a week it's very

expensive and the cheapest way to communicate with my family is to send [text-message], so I use it the moment I come here" (Group C, Chinese female).

Having access to the internet on arrival was very important for focus group participants, it allowed them to check in with friends and family, and access support.

"So the first day I arrived here I get access to internet within my room, and I talk to my family for one hour nearly... you want to find some support, when you don't know anyone here" (Group C, Chinese female).

While some participants reported challenges obtaining internet access on arrival, generally the focus groups did not report any difficulties accessing the internet after arrival, particularly when around the university campus.

"It's free to use the internet on campus, and I usually talk in the 3rd floor of the library. I find the little place there's not much people and I try to talk with [friends and family]" (Group C, Chinese female).

Internet access provided participants with flexibility, allowing them to access services that they were familiar with from back home and it allowed them to easily join new ones. Friends made on sojourn often used different services, and the ability to easily join new services helped participants to stay in touch with the people they met while on sojourn. Cost was also a motivation for using services on the internet, which according to focus group participants may be cheaper than other means of communication such as phone calls or text messages.

"Normally I use the internet when I contact other people... because it's cheaper" (Group A, Korean female).

Social networking sites

Participants said that they mainly used social networking sites to stay in touch with people back home while in Australia, which involved following the activity of friends and family and only sometimes communicating with them directly. This behaviour of following the activity of friends and family was reported to start occurring once they had left home, when they felt distant, wanted to find out what was going on or let people know that they were alright.

“While I'm in China I almost never use renren.com I don't care about that, but I'm here and it's the only way for me to get the information of their lives so I use it more frequently. Some of my friends they come to Australia but are not in UTAS... [my friends] write on renren.com and I read them in order to know what's in their life there” (Group C, Chinese female).

Social networking sites were also seen by participants as a useful way of staying in touch with people they met while on sojourn: *"I usually use Facebook to contact foreign students or Australian students, rather than my friends in Korea" (Group A, Korean female).* Participants also reported joining other social networking sites while on sojourn to stay in touch with friends which they made along the way.

For participants in group A, mini-homepage, a Korean social networking site, was reported as an important means of staying in touch with their friends back home.

Communication software

Communication software or tools were considered to be different from social networking sites. Software listed by participants included Skype, QQ (a popular Chinese online communication service), and MSN. QQ instant messenger was seen as an important means of communication by participants in Groups B and C. It provided multiple means of communication, from a video talk service to Facebook style social networking features and, importantly, instant messaging. While at home, this was reported as the primary means of communication and continued to be important for staying in touch with people back home while in Australia. Some participants reported some difficulties using these services while in Australia: *"We have a little inconvenience when we log on QQ on the library, because we have to use the web QQ, there’s no software" (Group B, Chinese male).*

MSN was seen as a professional, business oriented service; participants reported trying out the service but said that they did not actively use it to communicate. Skype was used to make affordable calls back home to family who could only be contacted by phone. Skype was used on mobile devices as an affordable means of calling friends and family back home.

Telephones and mobiles

Mobile phones were reported as a significant means of communication by participants in all four focus groups. A variety of different terms were used to describe them: ‘phone’, ‘phone call’ and ‘telephone’ were clarified by participants as meaning mobile phones. Landlines or

fixed phones were not used by participants from any group, some reporting that they did not even have them in their homes: *"We don't have a telephone in our house, all the neighbours have got is mobile phone numbers" (Group C, Chinese female).*

Mobile phone calls were a preferred means of communication with friends and family, and used by participants for regular or urgent communication. "*It's the fastest way and the easiest way... if we email them or Facebook them they may not check them" (Group A, Korean male).*

Text messaging was also used for organising face to face meetings or just for leaving a message for later, but rarely to communicate with people back home. In one case a participant reported that they sent a text-message to family back home but only in an emergency: *"I only send one once, [a] text message back to my family from here, because it is an emergency, someone stolen my QQ account and cheat on them, to make money.. and so I text them only once, emergency" (Group C, Chinese female).*

For those participants who had a smart phone such as an Apple iPhone, communication software including Skype, what's up, and voice messages were also used. Sending voice messages was an important means of communication for one participant: *"You don't need to pay for it through the communication company, so it's free and its very convenient, I can send voice messages to my friends in America, so I think oh it's great I like that, it's better than text message for me and very cheaper than phone calls" (Group C, Chinese female).*

"If we want to use telephone, we should have longer story to tell about it, but we can text to them just in a short sentence, like how is it going or something like that" (Group A, Korean female).

Some participants also reported owning multiple mobile phones, one which they had with them from home and a new one they needed to purchase on arrival: *"In my case I've got two phones, like Korean and Australian ones, when I contact with Australians I use Australian phone, in Korea I use Korean phone, I use different things for different people" (Group A, Korean male).*

Social activity

The most important means of communication reported by participants was face to face communication, which included meetings, meeting face to face, dates, social activities and church. "*QQ communications makes us feel a little bit kind of far aware or distanced, so it's better to communicate face to face to show respect and to express our emotions. Even with the technologies we can have a QQ video in with first, it's not so spontaneous due to the kind of internet connections… this is the most invaluable source of communication" (Group B, Chinese male).*

Participants frequently commented on how other means of communication were used to organise meetings with friends and that they, when possible, preferred to meet friends face to face: "*Sometimes I use QQ to confirm or to arrange a time or place to meet [people] face to face*" *(Group B, Chinese male).*

But not all participants reported actively engaging in social activities, one participant said that they found it difficult: *"In China I went to many social activities, but here I usually stay at home" (Group C, Chinese female).*

Meetings for social events, student societies or university programs were seen as a great opportunity to communicate with friends and meet new people while in Tasmania. Some participants mentioned that even attending the focus group discussions was seen as an opportunity to meet other students.

"I'm going to the falls festival, apply for volunteer job there, so I think that's a very great social activities, because a lot of people just come in there, the music the art you can meet peoples, talking, camping so you have more chance to know more peoples there" (Group C, Chinese female).

When it came to communicating with lecturers or tutors at university some participants felt that it was more difficult face to face, when compared to their situation back home. *"When I feel I need to communicate with someone about some issue, I want to talk with them face to face, because that's mostly what I did in China. Then I realise they have their own schedule, like my lecturer. If I have questions in China about my study I can always go to find them and ask for help, but in Australia it works differently, they have their own office hour and if you*

don't come in that time you have to make an appointment... then I start to begin to use email..." (Group B, Chinese male).

Other means of communication

Other means of communication were raised by focus group participants, these included the use of postcards, church, email, blogs and micro-blogs. Participants in Group B discussed at length the practice of sending postcards while overseas.

"When I go to different place, different countries I will send postcard to my boss to my friend to my family, yeah so they know where I am and have a look what this looks like. You know so just write seven sentence and then post them" (Group C, Chinese female).

"You know once I went to a foreign country, umm Indonesia, Bali Island, I went there for vacation, and my best friend told me to send her post card because she likes that. I bought lots of them, you know it's very expensive and I don't know how to send them, I can't find the post office so I write them and I keep them - and bring them home" (Group C, Chinese female).

"Postcard is some kind of information you communicate with other people, you can keep it, keep it for a long time, this information… in ten years, twenty years you can have a look" (Group C, Chinese female).

While in another conversation, a participant in Group B explained how some of her friends were hard to reach, and that she must attend church services in order to visit them.

"One of my friends goes to church frequently... although it includes some religious information, but most of the church are teenagers and are very young people, they organise some social activities that are very funny... I always turn out when there was activity ..." (Group C, Chinese female).

"They have a Facebook, and they circulate email information, so I get it. So basically I went to church once and sign up with the mail list and I get information... sometimes I went to church just to catch up with my friend" (Group C, Chinese female).

Across all the focus group discussions e-mail and its various reported types was an important means of communication, and a sub-theme associated with the internet. E-mail was regarded

as an effective way of communicating clearly with work, the university, lecturers and other important people. It provided participants with a sense of security knowing that records of important conversations were retained, and that they could carefully write letters when they did not feel confident in their ability to speak English. E-mail was not seen by participants as a means to communicate with friends or family.

"Sometimes I make phones calls and I don't understand, I feel a little embarrassed to call back or ask for them to repeat, with email you hardly get that problem" (Group B, Chinese male).

Participants also reported having blogs and using micro-blogs such as Twitter but when brought up in discussion little was said. Blogs as a means of communication were not considered significant by the discussion groups.

5.3. Discussion

This part of Chapter 5 presents discussion of the results as they relate to the aims of this study and the Research Questions (RQs) posed. The primary aim of the study was to understand the extent of ICT use by international students, and the RQs are reproduced here for reference:

- **RQ1:** To what extent are ICTs used by international students in their communication practices while on sojourn?
- **RQ2:** What are the *modes* and *means* of communication associated with certain practices?
- **RQ3:** Why are certain ICTs used or not used?
- **RQ4:** To what extent does ICT use change while on sojourn?

In response to RQ1 results of analysis from focus group discussions show that ICT clearly plays an important role in the lives of international students. Group discussions situated ICT in a complex but close relationship with how a student conducts their daily lives, the ICTs used are influenced by the journey experience. To address RQ2 it is clear from the results that at least for the international students who participated in the focus group discussions, there was a level of comfort when it came to using a wide range of ICTs. Table 52 lists some thirty-eight modes and means of communication, many of which are forms of ICT from cell phones to social media.

From group discussions it is obvious that even before leaving their home to study abroad an international student will likely be a competent user of ICT. The ICT available in the nations represented (China, Korea and Saudi-Arabia) was similar to that in Australia and some participants discussed the fact that in some cases the situation was better. But importantly ICT used changed between when they were living at home to current situations. Table 52 shows that the range of ICT changes between each of the three journey stages; to address RQ4 this suggests that ICT does change while a student is on sojourn, new ICTs are encountered and existing ones may be used in new ways as circumstances changed and needs arose.

When reflecting on the experience of arrival (Sort 2), participants reported using ICT that they were familiar with in new ways. Some groups discussed creating new social media accounts to follow friends and family back home when they felt distant or to keep in touch with friends that they met along the way. Groups discussed the strategies which they followed when choosing a means of communication, particularly when it came to managing their use. Participants in Group B even felt it necessary to list the names of Australian telecommunications companies – Telstra, Vodafone and Optus – on cards for discussion. Group B discussed at length the cost and other similarities between these businesses and businesses they were familiar with in China, when talking about choosing their mobile phones while in Australia. This discussion around cost and how it influenced the choice of medium was best illustrated by Group C, where one participant who could afford a smart phone talked about the means of communication that the device provided and how these were not accessible to other members of the focus group.

During the course of daily life, face to face contact through social activities with friends was reported as the most desirable means of communication. ICT was employed in a range of ways to organise gatherings and opportunities to meet face to face and to stay in touch. Importantly at each stage of the journey cell phones were relied upon, playing a central role in the communication practices of focus group participants. They mediated many other modes and means of communication, being used to arrange meetings, or social gatherings, access the internet or using communication software such as social media. Groups reported using multiple devices, such as a cell phone for when they were back home and a second phone for communicating with friends in Australia.

Table 52 shows that groups reported the use of most ICTs in their current situations (Sort 1), and groups reported feeling liberated by their journeys, with expanded horizons but also needs and requirements. Work, study and social activities were all important reasons for trying new modes and means of communication. But the question of why (or why not) certain ICTs are used, posed by RQ3, is complex. Barriers or issues accessing computers and the internet were only mentioned by participants at arrival, and issues were discussed in the context of a problem that could be solved. No significant barriers or access issues were reported as occurring in daily life. Groups reported finding it easy to adjust in this regard.

The visualisation of terms (the modes and means of communication reported) in Figure 19 provides further insight into the relationship between terms. Relative groupings indicate clear associations, but results also indicate association between row and column categories – that is, terms and sorts. For illustrative purposes Figure 25 provides a deconstruction of the visualisation into regions: regions 2, 4 and 6 group terms with a sort, and regions 3, 5, and 7 are groups of terms between (shared by) sorts; region 1 captures those terms central to all three sorts. This association can be verified simply by looking at frequency counts in Table 52, where terms with higher frequency counts are visually closer to the associated sort, and those with 0 farthest away.

Figure 25 provides support for the assertion that certain modes and means of communication including ICTs are associated with different stages in an international student's sojourn. The metaphor of a journey in three stages (Home, Arrival and Here) appears to provide a suitable framework for capturing change in ICT use. Although the term 'appropriation' provides a better representation of the practice occurring (Gordano, 2013), some ICTs will be appropriated temporarily, while for others like cell phones, the use will change and be adapted.

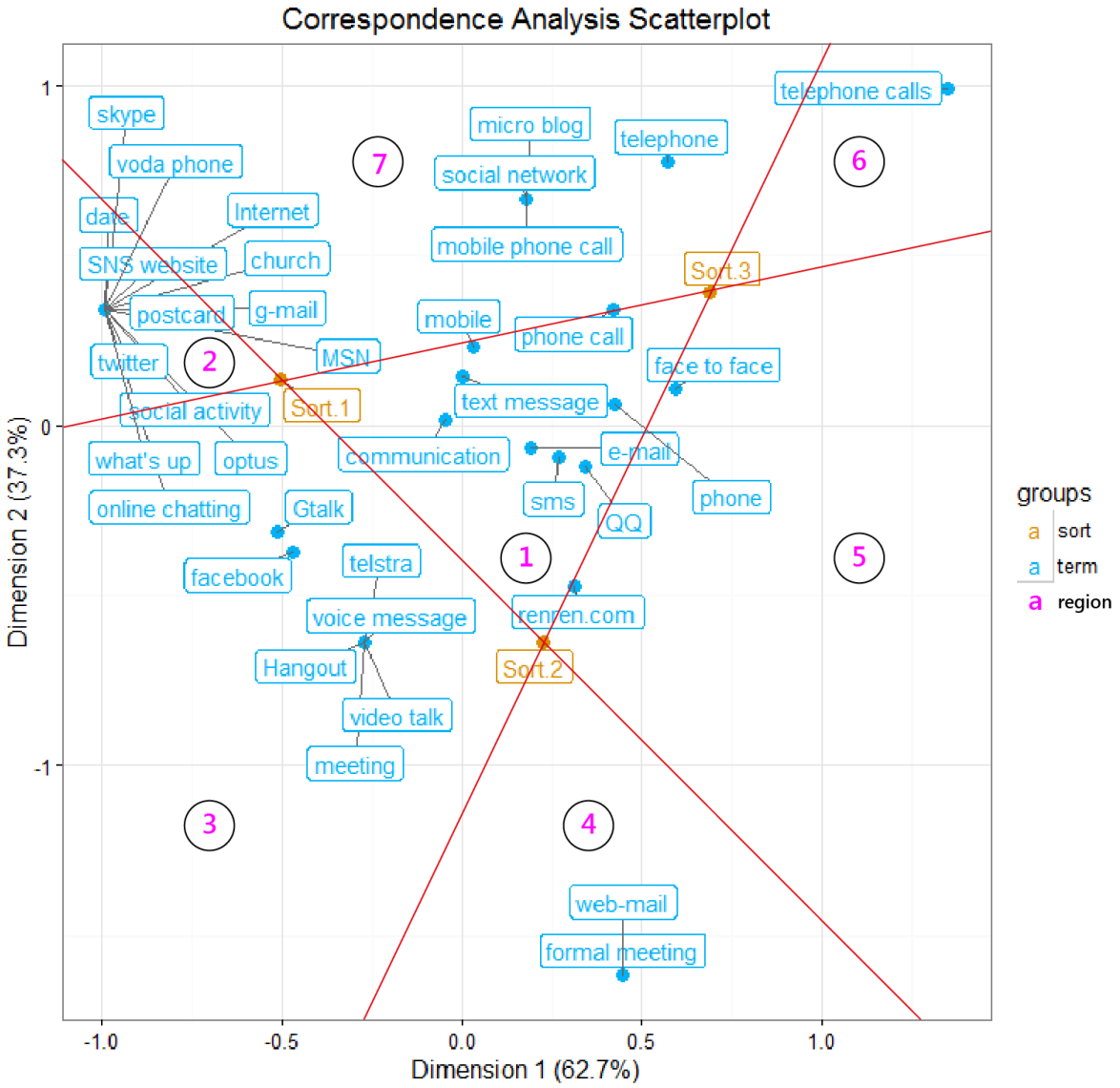


Figure 25: Deconstruction of correspondence into regions of term association with sort categories

5.4. Summary

This part of Chapter 5 presents a summary of the chapter in two parts. Part 5.2 presents the results of analysis for the Phase One study, results presented include those from the analysis of card sort data, which included ICTs and other concepts generated in the focus group exercises. Part 5.3 presents a discussion of the results, and the discussion is guided by the Phase One research aim and guiding research questions.

6. Phase Two research design

6.1. Introduction

This chapter describes the research design for the Phase Two study, which builds on results from Phase One. Before proceeding the study received ethical approval from the Tasmania Social Science Human Research Ethics Committee (HREC) at the University of Tasmania [Ethics reference H0013240]. The chapter is presented in the following four parts. Part two provides background information supporting the Phase One study. Part three presents the methods of data collection employed. Part four presents appropriate data analysis techniques. Part five presents procedures and processes followed for conducting the study.

- Part 6.2 provides a background to the study, presenting the aim and research questions, paradigmatic assumptions and a profile of the participants for the study.
- Part 6.3 presents the methods of data collection, in this case the research questionnaire.
- Part 6.4 presents a description of the techniques for data analysis, these included exploratory data analysis, scale development, Mokken Scale Analysis (MSA) and procedures to evaluate the monotonicity of scale items.
- Part 6.5 presents a description of the procedures for participant recruitment and conducting the research survey.

6.2. Background

This part of Chapter 6 presents background information supporting the Phase Two study, presented in three sections. Section 6.2.1 presents the study aim and supporting research questions. Section 6.2.2 presents the underlying philosophical assumptions, and section 6.2.3 presents a description of the participants recruited for the study and the study procedure.

6.2.1. Aims

This section presents the aims and research questions for this Phase Two study. The study was designed to clarify observations and subsequent questions arising from the Phase One study, specifically on the importance of mobile phones in the lives of international students staying in Tasmania. Other variables of interest emerging from the Phase One study related to mobile phone use included the length of time for phone ownership, time spent in Tasmania,

and an individual's ICT capability. The aim of the Phase Two study was to investigate the relationship between mobile phone use and variables of interest within a sample of the international student population staying in Tasmania. The study aim was guided by a series of research questions arising from observations from the Phase One study. The aim was supported by the following five Research Questions (RQs):

- **RQ1:** To what extent and in what ways are mobile phones used by international students?
- **RQ2:** To what extent are mobile phones used to access support information?
- **RQ3:** To what extent do international students rely on their mobile phones?
- **RQ4:** Is there a significant difference between those with smart phones and those without?
- **RQ5:** Is there a significant difference between 'first year' international students and those in later years?

6.2.2. Paradigmatic assumptions

This section presents the philosophical assumptions which underpin the Phase Two study's research design. The research paradigm is that of post-positivism, also known as critical rationalism. Post-positivism adopts a less privileged position when it comes to epistemological or metaphysical claims than positivism, it is possible for quantitative work to be presented in a non-positivist form, and for qualitative work to be presented in a positivist form and vice versa (Crotty, 1998). For example, confirming or validating findings in an exploratory study with qualitative methods may be a thoroughly positivistic activity if the goals of objectivity, validity and generalisability are valued by the researcher in that process and not achieved through the use of qualitative or quantitative methods (Crotty, 1998, p. 41).

In this way, the natural and social sciences may vary in their content but share the same logic of inquiry. Post-positivism rejects the epistemology of empiricism held by the positivist stance and the shallow realist ontology in favour of a cautious, depth or subtle realist ontology, depending on whether the research strategy is indicative or deductive. For this study the research strategy followed is an inductive one. The study aims to establish limited generalisations about patterns of association among observed characteristics of international students' mobile phone use while staying in Tasmania (the phenomenon). This study follows the inductive research strategy in order to describe certain characteristics of international

students, determined by results and findings from the Phase One study. Analysis of patterns and relationships between these characteristics then provide a more detailed description of the phenomenon and inform further investigation (Blaikie, 2007, p. 69).

The ontological position is one of the subtle realist, where reality is 'the product of the interpretations of social actors, and changes that result from putting these interpretations into practice over time' (Blaikie, 2007, p. 17). This study adopts a conventionalist epistemology, as Blaikie (2007) suggests that the epistemology of conventionalism may be adopted in place of empiricism where the inductive research strategy is used, but that if the research strategy is combined with another (for instance part of a retroductive or abductive process) then their epistemological position may be adopted instead. Conventionalism 'regards knowledge generation pragmatically', similarly to the constructionist epistemology conventionalism regarding reality as a human creation and scientific theories being created by scientists as tools to deal with the world (Blaikie, 2007, p. 23).

6.2.3. Participants

This section presents details of the participants recruited for the Phase Two study. To broadly study the international student population in Tasmania, a sample of international students was drawn from the University of Tasmania's student population. According to statistics from the Australian Government Department of Education and Training, the University of Tasmania is responsible for the majority of international students studying in the state of Tasmania, enrolling a total of 5636 international students in 2011.

According to data provided by the University of Tasmania, in 2012 the University had approximately 3275 international students enrolled onshore. The top 10 countries at the time by proportion of students are listed in Table 14; students from Asian countries represent over 60% of the population, with a total of 110 unique countries represented. 57% of the population were male while 43% female, the age profile for the population was a mean age of 26.95 with the median being 25. The minimum age was 19 and the maximum 65.

COUNTRY	COUNT	%
China	1058	32.30%
Malaysia	657	20.05%
Singapore	349	10.65%
South Korea	135	4.12%
Saudi Arabia	93	2.84%
Vietnam	84	2.56%
United Arab Emirates	93	2.84%
India	72	2.20%
United States of America	76	2.32%
Hong Kong	55	1.68%
Other (100 different countries)	608	18.44%
TOTAL	**3275**	**100%**

Table 14: Top 10 countries in 2012 by proportion of enrolled onshore international students based on University of Tasmania SERRU data.

Demographic characteristics like age, gender or nationality are thought to have an effect on the use of technology by migrants. Other factors like language, education or level of income may also have an influence but were captured in data collection rather than the screening process. These potential influences were considered when drawing a sample frame for the study. Ideally a sample which fit patterns of key demographics, including age, gender and nationality, was desired to provide a view similar to that of the population.

The sample frame for the study is international students staying in Tasmania to study a degree course at the University of Tasmania. To be selected a student must have been currently enrolled in a course of study at the University of Tasmania and a participant needed to have or own a mobile phone. A purposive sampling strategy was adopted, where typical instances were recruited with the aim of achieving a 'good fit' between the study sample and the University of Tasmania's international student population. The sample characteristics were determined based on University of Tasmania enrolment data from the 2011–2012 period, provided by the University of Tasmania's Student Evaluation and Review Unit – SERRU – in 2013.

6.3. Data collection

This part of Chapter 6 presents the methods of data collection employed by this Phase Two study, separated into two parts. Section 6.3.1 presents the research questionnaire developed to survey international students and information about development of an only survey instrument.

6.3.1. Research questionnaire and survey instrument

This section presented the research questionnaire developed for the Phase Two study. To address the research aims a questionnaire was developed containing 37 items or a total of 63 questions. The questionnaire design was based on questions used by the PEW Research Centre questionnaires (Rainie & Fox, 2012) and the International Student Barometer (ISB) report (Verghese & Brett, 2010). The book Asking Questions (Bradburn et al., 2004) also provided guidance on the questionnaire design when it came to demographic and behavioural questions. The questionnaire was divided into several sections as shown by Figure 26, which provides an outline of the questionnaire developed. Research Question (RQ) 1, 2 and 3 were addressed by questions included under sections 5 and 3. For questions about mobile phone use, RQ 4 was addressed by section 4 and RQ 5 by sections 2 and 5.

An online survey instrument allowed data to be easily collected from a greater number of international students than other self-reporting methods such as interviews or paper questionnaires. The questionnaire was formatted into an online survey run using LimeSurvey (LimeSurvey, 2016), an open source survey software package. The software was hosted using external webhosting managed by the researcher through an external webhosting service. This arrangement allowed management and control of the software's configuration and data. An accompanying website was established to provide information about the study to participants and the public, and it provided a registration form and access to the survey questionnaire for willing participants.

Outline of the survey questionnaire with response data types

1. **Demographic questions**
    a. **[Interval]** How old are you (in years)?
    b. **[Nominal]** What is your Gender?
    c. **[Nominal]** Is English your first spoken language?
    d. **[Nominal]** What is your first spoken language?
    e. **[Nominal]** What is your nationality?
2. **Questions about experience of travel, study and living in Australia**
    a. **[Nominal]** Before you first travelled to Australia had you ever travelled abroad to another Country, for any reason?
    b. **[Nominal]** Before you first travelled to Australia, had you ever lived in a country other than your home country, for any length of time?
    c. **[Nominal]** Before you enrolled to study at the University of Tasmania, had you visited Australia for any length of time?
    d. **[Nominal]** Have you studied any of the following kinds of courses in Australia before enrolling to study at the University of Tasmania?
    e. **[Ordinal]** What type of degree course are you currently enrolled to study at the University of Tasmania?
    f. **[Nominal]** Which University of Tasmania Campus are you enrolled to study at?
    g. **[Ordinal]** For how long have you been enrolled as a student at the University of Tasmania?
    h. **[Nominal]** Do you currently have any family or relatives living in Australia?
    i. **[Nominal]** Do you have any family or relatives living in Tasmania?
3. **Questions about living arrangements in Tasmania**
    a. **[Interval]** For how many months (approximately) have you been living in Tasmania?
    b. **[Nominal]** Please indicate from where your main source of income comes from, while living in Tasmania
    c. **[Nominal]** Please indicate your current living arrangement while staying in Tasmania
    d. **[Nominal]** Do you have access to a Desktop Computer where you are living?
    e. **[Nominal]** Do you have access to an Internet Connection where you are living?
    f. **[Nominal]** Do you have access to a landline (telephone) where you are living?
    g. **[Nominal]** Do you currently own any of the following items?
4. **Questions about mobile phone ownership**
    a. **[Nominal]** Do you currently own a mobile phone?
    b. **[Nominal]** What is the main reason that you do not own a mobile phone?
    c. **[Nominal]** Do you currently own more than one mobile phone?
        i. **[Nominal]** What is the main reason for you to own more than one mobile phone?

d. **[Interval]** For how many months (Approximately) have you owned your current mobile phone?
e. **[Nominal]** Some mobile phones are called 'smart phones' because of certain features that they have such as software applications (Apps), internet access and/or a touch screen. Is your mobile phone a smart phone?
f. **[Nominal]** Which of the following best describes the kind of mobile phone that you have?
g. **[Interval]** On average how much money (is dollars) do you spend on your mobile phone bill each month?

5. **Questions about mobile phone use**
   a. **[Ordinal]** Thinking about your mobile phone, how would you rate your ability to use it?
   b. **[Ordinal]** Thinking about how you use your mobile phone while staying in Tasmania. How often would you say that you have used it to do the following?
   c. **[Ordinal]** Thinking about things that you have done using your mobile phone recently. In the last 30 days have you used your mobile phone to find-out some information about any of the following?
   d. **[Nominal]** In the last 30 days have you used your mobile phone to coordinate a gathering, meeting, date or get together?
   e. **[Nominal]** In the last 30 days have you used your mobile phone to contact a friend, family member or relative in a country outside Australia?
   f. **[Nominal]** What is the main way in which you contacted that person using your mobile phone?
   g. **[Nominal]** In the last 30 days have you used your mobile phone to share some information with two or more people using your mobile phone?
   h. **[Ordinal]** If you were to lose your mobile phone for some reason, how significantly do you think not having your mobile phone would affect your life?

Figure 26: Outline of the survey questionnaire with response data types

6.4. Data analysis

This part of Chapter 6 presents the approaches towards data analysis in four sections. Section 6.4.1 presents the methods to be used for exploratory data analysis. Section 6.4.2 presents methods of scale development used to evaluate responses to survey questions. Section 6.4.3 and section 6.4.4 present the Mokken Scale Analysis technique and associated procedures for evaluating scale items.

6.4.1. Exploratory data analysis

This section provides an overview of the visual and statistical methods to be employed for exploratory analysis of survey questionnaire data. Firstly, aims of the Phase Two study involve describing characteristics of international student mobile phone use. Here descriptive

statistical methods are appropriate, data must firstly be described before other procedures are applied or inferences may be drawn.

Descriptive statistical techniques include visual representations of data to aid interpretation by the researcher. By organising data in logical ways, patterns and characteristics of the data may become visible. This process of visual analysis is also known as exploratory data analysis. Many frameworks have been developed to guide exploratory data analysis, such as the methods used by John Tukey (1977) or procedures for the display of data (both qualitative and quantitative) by Edward Tufte (2001). Methods range from those designed to follow 'scientific' frameworks (W. S. Cleveland & McGill, 1984) to less prescriptive analytical processes for making sense of data (Few, 2009). The process of exploration can also reveal information that may also yield conclusions to questions not originally asked or even thought of (William S. Cleveland, 1994).

Visual techniques give the researcher a grasp of the data's shape, and the application of statistical measures such as the mode, median and mean can further describe this. These are known as measures of central tendency and they describe the centre of a data distribution. Measures may also be applied to examine the distribution of data (is data very similar, or different?) and its variance both within the sample and in comparisons between the sample and population or theoretical distributions (such as the normal distribution) (Howell, 2008). These techniques deal with analysis of single variables, to consider the relationship between two or more variables techniques designed to measure correlation – the strength of the relationship between variables are required. Visual representation techniques such as scatter plots are also useful for this purpose, or any techniques that compare two or more variables (Howell, 2008).

Pearson's Product-Moment Correlation can be used to measure the strength of relationships between variables using response data from a sample gathered using techniques such as a questionnaire. The function for Pearson's Product-Moment Correlation (***r***) measure the strength of relationship through their covariance – the degree to which two variables vary together. The function for (***r***) is defined as:

$$r = \frac{\sum(x - \overline{x})(y - \overline{y})}{\sqrt{\sum(x - \overline{x})^2 \sum(y - \overline{y})^2}}$$

Where ***x*** and ***y*** are the scores to compare, $\overline{x}$ and $\overline{y}$ the mean scores and $(x - \overline{x})$ is known as the deviation score, measuring the degree to which ***x*** deviates from the mean (Howell, 2008, p. 181). The values returned indicate the strength of relationship between two variables, with a value ranging between 1 and -1 indicating a positive or negative relationship. A value of 0 indicates that there is no support for a relationship between variables in the data supplied (Howell, 2008).

Pearson's (r) is intended for the comparison of two continuous variables and their linear relationship, other measures have been developed to assess the relationship between two variables with other scale properties. In the case of ordered, categorical variables Spearman's Rank correlation coefficient (r_s) (Spearman's rho) may be used when one or both variables are skewed or ordinal. For example, given a sample of paired data, (X_1,Y_1),…,(X_n,Y_n) with rakings the where ***X*** is ranked separately to ***Y***, R_i = rank X_i, and S_i = rank Y_i , then:

$$r_s = \frac{1 - 6\sum_i (R_i - S_i)^2}{\{n(n^2 - 1)\}}$$

If ties are present, then a mid-rank formula is used as follows:

$$r_s = \frac{N\left(N^2 - 1\right) - 6\sum_i (R_i - S_i)^2 - 6(U + V)}{[\left\{N\left(N^2 - j\right) - U\right\}\left\{N\left\{N^2 - 1\right\} - V\right\}]^{1/2}}$$

Spearman's r_s is a measure of the monotone relationship between two variables, and is unaffected by any strictly increasing transformation of the ranked variable(s). This a property that makes Spearman's r_s less sensitive to outlying values in underlying data (Pirie, 2004).

6.4.2. Scale development

This section describes the development of item scales for questions **5.b** and **5.c** on the questionnaire. Part five (5) of the questionnaire – 'Questions about mobile phone use' – asked a series of questions in relation to frequency and uses for the mobile phone (Figure 26). Questions **5.b** and **5.c** attempt to measure two latent variables (traits) of the individual students, (a) their ability to use the phone, and (b) their use of the phone to meet support needs (dependent on the phone for support being the trait in question). The reliability of questions **5.b** and **5.c** can be checked against two other questions; question **5.a** asks respondents to rate their own ability to use the mobile phone, and question **5.h** asks

respondents to rate how significant losing their phone would be, to measure their dependence on the mobile phone.

To measure the latent traits two scales were constructed using Likert Scale response variables. The first scale **5.b** was designed to measure international students' ability to use their mobile phone by asking eight related questions derived from surveys run by the PEW research centre (Rainie & Fox, 2012). The eight questions began with: 'Thinking about how you use your mobile phone while staying in Tasmania: …'

1. How often would you say that you have used it to do the following? [Send or receive a text message (SMS or MMS)]
2. How often would you say that you have used it to do the following? [Use or download software applications (Apps)]
3. How often would you say that you have used it to do the following? [Send or receive an email]
4. How often would you say that you have used it to do the following? [Access the internet using a web browser]
5. How often would you say that you have used it to do the following? [Use social media (such asa Facebook, Twittertwitter etc.)]
6. How often would you say that you have used it to do the following? [Take a picture]
7. How often would you say that you have used it to do the following? [Record some audio]
8. How often would you say that you have used it to do the following? [Record a video]

Five response categories were included: (1) Never, (2) Less often, (3) A few times a week, (4) Once a day, and (5) Several times a day. Asking respondents to indicate the range of functions used and the frequency of use was used to a measure of ability. For question **5.c** eight questions were also used, asking about different areas of need for international students identified in the literature (Brown, 2009; Poyrazli & Grahame, 2007). The questions began with, 'Thinking about things that you have done using your mobile phone recently: …'

1. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Accommodation]
2. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Transportation]
3. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Finances]
4. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Health]
5. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Support services]
6. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Your studies]
7. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Employment]
8. In the last 30 days have you used your mobile phone to find-out some information about any of the following. [Food or other essential items for your daily life?]

Three response categories were included: (1) Yes, (2) Uncertain and (3) No. The approach here was one of brevity to achieve a clear response from participants without too many options. It must be noted that before results could be tallied and a total score attributed to respondents for use in further analysis, the reliability of scale results needed to be evaluated. Scales **5.b** and **5.c** were new and untested – thus part of the studies analysis needed to focus on evaluation of the two scales.

Likert Scales are categorical in nature and as a result, data may in the worst case violate assumptions of traditional methods designed for analysis of interval or ratio scale data. It is argued that at best data from Likert Scales may be considered nominal or categorical in nature (risk error) (Jamieson, 2004). In this way ordinal responses may be converted to interval data, I.e. (1) Strongly agree, (2) Agree, (3) Disagree may be represented as an interval scale where (Strongly agree) = 1, (Agree) = 2, (Disagree) = 3 but the distance between the values is subjective. More recently it is argued that modern statistical models such as reliability analysis and factor analysis are suitably robust to handle discrepancies in data, but there are additional benefits to using a technique specifically designed for categorical response data (Norman, 2010).

While it is possible to estimate the interval values of a Likert Scale, converting responses means that information is lost in the process. The use of specialised non-parametric Item Response Theory (IRT) models helps to maximise the usefulness of data acquired and provides additional benefits. Models can help to diagnose aberrances in response data, complement goodness-of-fit tests and can be used to describe the probability of success on test items as a monotonic function of the underlying ability (Van der Linden & Hambleton, 2002, p. 348). A solution to test and analyse the scales developed for questions **5.b** and **5.c** can be found in Mokken Scale Analysis (MSA) a non-parametric probabilistic IRT model for categorical response data.

Item Response Theory (IRT) models

Item Response Theory (IRT) is a theory about how people answer questions, where questions are known as items, and the behaviour of a person when choosing an answer are called responses (Van Schuur, 2011a). Modern ITR comprises a collection of models and techniques for the analysis of this item level data to measure inter-individual variation on measurement scales (Edelen & Reeve, 2007, p. 5). IRT models are probabilistic, designed to test the probability that a person will do better (or worse) than another if that person has more of a particular latent trait. In this case latent traits are defined as unobservable psychometric properties such as abilities, achievements, attitudes, personality traits, and so on (Sijtsma & Molenaar, 2002a).

IRT models differ from factor analysis and other kinds of Classical Test Theory (CTT) in that CTT models focus on the outcome for a scale ‘as a whole’; IRT models instead focus on specific response probabilities for each person–item combination on a scale (Edelen & Reeve, 2007). Broadly two types of models are used to describe responses: Dichotomous models where two options are present (for instance Yes or No) and Polytomous models where three or more ordered response categories are present on the scale (Ostini & Nering, 2006). Variations of these models also exist to handle parametric and non-parametric item response values, and multi-dimensional models have been developed to handle the presence of more than one latent trait.

6.4.3. Mokken Scale Analysis (MSA)

This section presents the method of Mokken Scale Analysis (MSA). MSA is a non-parametric probabilistic IRT model and procedure for assessing latent traits such as a

person's abilities, attitudes etc. by analysing a person's pattern of responses to a set of questions designed to be indicators of the latent variable under study. Non-parametric IRT models originate from the early manifestations of scalogram analysis, latent structure analysis and latent trait theory. Scalogram analysis and related models are known as deterministic, and in these deterministic models it is assumed that an underlying unobservable latent trait is responsible for (related to) a person's response pattern, which 'triggers' a positive response (Mokken, 1997; Van Schuur, 2003).

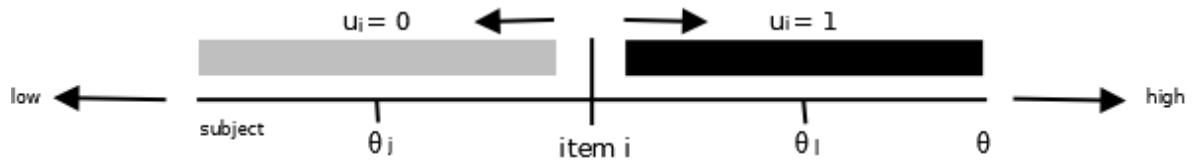


Figure 27: Deterministic model (Guttman scalogram) redrawn from (Mokken, 1997, p. 352)

For example, Figure 27 shows a deterministic model for dichotomous item i (with response values 0 or 1), where there is only one step separating response '0' from response '1'. This step marks the boundary on the latent trait variable θ: Persons with ability θ_j to the left of the boundary do not have sufficient θ to pass item i, and score 0. Persons with ability θ_l to the right of the boundary have a sufficient amount of θ to pass item i and score 1 (Mokken, 1997, p. 352).

In this way the deterministic model makes three important assumptions: (1) that the latent trait is a single trait and can be measured on a one-dimensional scale; (2) that a person with a scale value lower than an items scale value will give a negative response, and a person with a scale value equal to or higher than an items scale value will give a positive response; (3) that the value θ of the latent trait determines the probability of a positive response to each item on the scale, independent from any other systematic influence (a property known as local stochastic independence) (Van Schuur, 2011b).

For a set of items a 'deterministic cumulative scale' forms if all persons who give a positive response to a difficult item also give a positive response to all easier items for that set of items on a scale. This is known as the 'dominance model', also referred to as Guttman Scaling (Van Schuur, 2011b). However, in practice the dominance model rarely holds and

responses to items on a scale often violate the model to a certain degree, and when the response pattern violates this model the probabilities can be anywhere between 0 and 1 (Van Schuur, 2011c).

To allow for this error and other unknown influences on response behaviour the deterministic model needs to be redefined as probabilistic. We can revisit assumption two (2) and instead assume that a person with a higher scale value (0j) will have a higher (or at least not lower) probability of giving a positive response to an item than a person with a lower scale value. In this way response patterns (no longer model violations) have a certain probability of occurring.

Following these assumptions the probabilities ***P*** for responses $\boldsymbol{U_{ij}}$ (by persons ***J*** and ***l***) to item ***i*** can be formulated as the functions (Mokken, 1997, p. 352):

i. $P\{U_{ij} = 1; \theta_j\} = 0;$
ii. $P\{U_{ij} = 0; \theta_l\} = 1.$

Further, these functions can be made more general by generating probabilities depending on item ***i*** and the value of **θ** for a single person ***j*** as:

i. $\pi_i(\theta_j) = P\{U_{ij} = 1; \theta_j\}$, and
ii. $1 - \pi_i(\theta_j) = P\{U_{ij} = 0; \theta_j\}.$

The probability functions $\pi_i(\theta)$ are called the Item Response Functions (IRFs), the values of $\pi_i(\theta)$ reflect the difficulty of item ***i*** for a person located at point **θ** on the unidimensional continuum (Mokken, 1997). The deterministic model can also be formulated in terms of probabilities, in this case the IRFs are referred to as step functions, as the probability of a positive response steps up from 0 to 1 without any intermediate value. Figure 28 provides an illustration of the function for deterministic and probabilistic scale values.

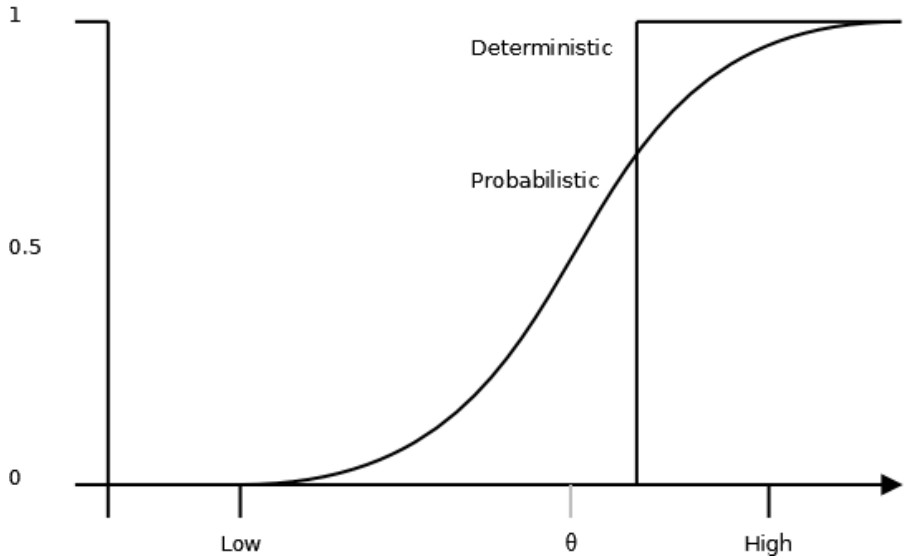


Figure 28: Deterministic and probabilistic functions (Van Schuur, 2011c)

The Monotone Homogeneity (MH) and Double Monotonicity (DM) models

Assumptions made in the probability function $\pi_i(\theta)$ imply certain types of homogeneity between scale items (Mokken, 1997). A cumulative scale which conforms to the three assumptions previously discussed, that is (1) it measures a single latent trait, (2) has increasing IRFs and (3) has the property of local stochastic independence, conforms to the model of Monotone Homogeneity (MH). The single monotonicity model was the first of two models devised by Mokken, based on the three assumptions the MH model requires for all items $\boldsymbol{i}$ in $\boldsymbol{I}$ ($\boldsymbol{i} \in \boldsymbol{I}$):

- $\boldsymbol{\pi_i(\theta)}$ (the IRF) should be monotonically non-decreasing in $\boldsymbol{\theta}$, where $\boldsymbol{\theta_j \leq \theta_l \leftrightarrow \pi_i(\theta_j) \leq \pi_i(\theta_l)}$, and
- a set of items in $\boldsymbol{I}$ (or IRF's) is similarly ordering a set of persons $\boldsymbol{\theta_1, \theta_2 \ldots \theta_N}$ when $\boldsymbol{\pi_i(\theta_1) \leq \pi_i(\theta_2) \leq \ldots \leq \pi_i(\theta_N)}$, and $\boldsymbol{\pi_k(\theta_1) \leq \pi_k(\theta_2) \leq \ldots \leq \pi_k(\theta_N)}$ for all $\boldsymbol{k \in I}$ items.

According to Mokken, the similar ordering property (SO) and the MH function are equivalent properties, the SO property 'reflects the possibility of a unidimensional representation of the persons in terms of an ability supposed to underlie their response behaviour' (Mokken, 1997, p. 353). The MH and SO properties allow for the joint ordering of persons on an ability where items order persons.

In a test containing ***I*** items, a person's score for an item ***i*** may be denoted as $\boldsymbol{X_i = 0, \ldots, m,}$ for the total score as $\boldsymbol{X_+}$ (the unweighted sum of ***I*** item scores $\boldsymbol{X_i}$). Where MH holds $\boldsymbol{X_+}$ may be used reliably to order persons with respect to the latent trait **θ**. The function for the total test score is then:

$$X_+ = \sum_{i=1}^{I} X_i$$

If the requirements of (1) unidimensionality (**θ** is unidimensional), (2) local independence (item scores are independent given **θ**) and (3) monotonicity – where the probability ***P*** of score $\boldsymbol{X_i} = 1$ denoted $\boldsymbol{P(X_i = 1|\ \theta)}$ is a non-decreasing function of **θ** for all ***i*** in ***I*** **–** are met then MH implies the stochastic ordering of **θ** by $\boldsymbol{X_+}$ also referred to as SOL (Hemker, Sijtsma, Molenaar, & Junken, 1997).

For a pair of dichotomous item scores where $\boldsymbol{x_{+a} < x_{+b}}$ and any $\boldsymbol{\theta = t}$ the SOL function may be defined as $P(\theta \geq t|X_+ = x_{+a}) \leq P(\theta \geq t|X_+ = x_{+b})$ the SOL property further implies stochastic ordering of the manifest score $\boldsymbol{X_+}$ by the latent trait **θ** which for any pair of respondents ***a*** and ***b*** with $\boldsymbol{\theta_a < \theta_b}$ and any $\boldsymbol{x_+}$ is defined as: $P(X_+ \geq x_+|\theta_a) \leq P(X_+ \geq x_+|\theta_b)$. For polytomous items the difference is the range of the total score $\boldsymbol{X_i} = 0, \ldots, \boldsymbol{m}$ for a total score $\boldsymbol{X_+} = 0, \ldots, \boldsymbol{mI.}$ The two functions of SOL are symmetrical but in practice only ordering by $\boldsymbol{X_+}$ may be observed and inferences with respect to **θ** must be based on $\boldsymbol{X_+}$ (Hemker et al., 1997; Sijtsma, 2001).

It must be noted that in the case of polytomous items the strict form of SOL does not always hold, but the presence of *weak* SOL may instead be an estimate (Van der Ark & Bergsma, 2010). *Weak* SOL allows a sample of persons to be reliably divided into groups of respondents with high and low values of **θ** (Van der Ark & Bergsma, 2010).

The presence of MH allows the ranking of persons with respect to the latent trait **θ,** however MH is not by itself sufficient to confirm a uniform rank ordering of items, i.e. the ordering of items by persons. Mokken's second model is that of Double Monotonicity (DM),) which places stronger requirements on $\boldsymbol{\pi_i(\theta)}$ to ensure similar ordering of items by persons and persons by items to reflect the local difficulty order of items (Molenaar, 1997).

- For a MH set of items ***I*** DM is present with respect to an ability **θ** or set of persons ***j*** ϵ ***J*** if for all item pairs (***i***, ***k***) ϵ ***I*** it holds that $\boldsymbol{\theta_0}$**:** $\boldsymbol{\pi_i(\theta_0) \leq \pi_k(\theta_0)}$ and **θ:** $\boldsymbol{\pi_i(\theta_j) \leq \pi_k(\theta_j)}$ for **θ** and set of persons ***J*** where item ***i*** is assumed to be the more difficult item.
- The item difficulty function reflecting the order of local item difficulties **b** (i.e. $\mathbf{b_1}$, $\mathbf{b_2}$, $\mathbf{b_3}$) can be expressed as $\mathbf{b_1} > \mathbf{b_2} > \mathbf{b_3} \leftrightarrow$ for all **θ:** $\boldsymbol{\pi(\theta, b_1) < \pi(\theta, b_2) < \pi(\theta, b_3)}$ where item 1 is the most difficult item.

The DM model is thus based on the assumptions of unidimensionality, local independence, and monotonicity present in the HM model, adding the requirement of non-intersection of IRFs, this is also referred to as Invariant Item Ordering (IIO). For a set of items ***I*** this requirement can be expressed as $\boldsymbol{P_1(\theta) \leq P_2(\theta) \leq \ldots \leq P_I(\theta)}$**,** for each **θ.** IIO applies to individual **θ** and is an important property to evaluate when comparing persons with respect to their performance on individual items (Sijtsma & Molenaar, 2002b).

A simple procedure for checking IIO can be to test whether the order of difficulty of items is the same across subgroups (i.e. men vs. women, age etc.) as IIO implies that item ordering is invariant across different subgroups (the same) for a population even if values differ. The IIO assumption may be tested by investigating the IRFs for two items, common procedures include checking item rest scores (item rest score method) or by checking the **P**(+ +) and **P**(- -) matrixes and the Coefficient ***H*** (Sijtsma & Molenaar, 2002b). Independent checking procedures such as 'method manifest' IIO (MMIIO) may also be applied (Ligtvoet, Van der Ark, Te Marvelde, & Sijtsma, 2010).

MH and DM models for polytomous items

The models for Monotone Homogeneity (MH), Double Monotonicity (DM) and associated procedures presented in this section have [for the most part] been for sets of items with dichotomous response categories (i.e. 0/1 or Yes/No), but these models can be readily expanded to support items with polytomous response categories (i.e. more than 2),) provided certain additional requirements are placed on underlying assumptions (Molenaar, 1997). Molenaar demonstrated that dichotomous models may be expanded through the introduction of an 'item step'. For each item ***i*** with ***m*** categories, the latent trait is divided into ***m*** ordered areas that are separated by ***m - 1*** item steps. The ***m -1*** items steps can be regarded as ***m -1*** new dichotomous variables. For persons ***j*** each item ***i*** is decomposed into ***m - 1*** dichotomous

item steps denoted by the indicator V_{ijh} where $h = (1, 2, ..., m - 1)$, the score of person j and item i for responses U_{ij} is then equal to the number of steps passed (p. 370):

$$U_{ij} = \sum_{h=1}^{m-1} V_{ijh}$$

It follows that for the polytomous case the item step function may expand Mokken's dichotomous Item Response Function (IRF) into an Item Step Response Function (ISRF) which is defined for each ability value **θ** by:

$$\pi_{ih}(\theta) = P(V_{ijh} = 1; 0) = P(U_{ij} \geq h; \theta)$$

The requirement of MH for ISRFs is then $\pi_{ih}(\theta)$ for $(m - 1)*n$ item steps. Similarly DM requires that the difficulty order of all item steps is the same for each ability value. The item step indicator V_{ijh} with items $i, k \in I$ for $g, h \in (1, 2, \ldots, m - 1)$ item steps can be expressed as:

$$V_{ijh} = 1 \rightarrow V_{ijg} = 1 \text{ for all } g < h;$$

$$V_{ijh} = 0 \rightarrow V_{ijg} = 0 \text{ for all } g > h.$$

Tests for MH and DM are carried out for each of the dichotomous item step variables separately (Van Schuur, 2003). The resulting assumptions and practical consequences for MH and DM models presented earlier are similar for the expanded case. For explanation see Molenaar (1997), and Van Schuur (2003).

6.4.4. Evaluating monotonicity on a Mokken scale

This section presents the methods used to evaluate the monotonicity model for scale items in a Mokken Scale. Monotonicity plays a central role in most nonparametric and parametric IRT models, capturing the intuitive idea that for items which measure the latent trait **θ**, a higher **θ** corresponds to a greater probability that a person answers the question correctly, allowing the measurement of the trait (Junker & Sijtsma, 2000). Therefore, it is essential to evaluate the assumption of monotonicity through a process of fitting the model to data and evaluating the item fit. To this end it has been established that by evaluating the shape of estimated IRFs or ISRFs, information about how IRFs and ISRFs deviate from expected monotonicity can be used to evaluate monotonicity for items on a scale.

Rest score method

A person's rest score may be used to test that the IRFs or ISRFs for a scale of ***I*** items fits the MH model. The rest score is a person's sum score on the other ***I*** – 1 items on a scale (less the item under study). This is a fractional score, as using a total score would give an inflated value as the item itself would contribute to the total score (Molenaar, 1997, p. 374).

I – 1 items give rise to ***I*** different possible scale values (0 – (***I*** -1)), using the rest score persons can be differentiated into ***I*** different rest score groups. For a scale of ***I*** items a total sample may be divided into score groups that contain all persons with total score T= t, where t = 0,1, …, n*(m-1). The scale is valid if persons with scores T = t + 1 have on average higher ability values than persons with scores T = t. This method focuses on the fraction of persons passing a fixed item step in the rest score group which can be expressed as R = r for r = 0, 1, …, (***I*** - 1)*(m - 1). As rest score groups are formed there is a chance that some groups will be sparsely populated with few or no persons, to account for this, adjacent groups may be joined until each new group contains enough persons, and the number of groups formed must be determined by the researcher and it is best to test different parameters (Molenaar, 1997).

A violation of the MH model occurs when an item step is passed by a larger fraction in some rest score group than in some higher rest score group, and the violation can be measured in terms of the difference between such fractions. The number of violations, their sum, maximum and significance (in the form of a ***z***-value) may all be considered when evaluating model fit (Molenaar, 1997). According to Molenaar (1997) it is common to find violations through the use of this procedure, but provided that they are numerically small with low ***z***-values in most cases they may be attributed to sampling error.

Rest scores may also be used to test non-intersection of IRFs and ISRFs for evaluating the presence of DM. To test for non-intersection pairs of items and their item steps, curves need to be evaluated, in this case rest score is defined as the sum score on the remaining ***I*** – 2 items (less the two items under study). A violation occurs if the more popular item step is less popular in a certain rest score group. As a violation involves two items a single item may be responsible for many violations and the removal of an offending item may resolve this (Molenaar, 1997).

The P(+ +) and P(- -) matrix method

This method uses two symmetrical matrices **P**(+ +) and **P**(- -) (also referred to as the Π and $\Pi^{0,}$ $P^{1,1}$ and $P^{0,0}$ or P and P(0) matrixes) to investigate IRF non-intersection and the DM model (Sijtsma, Meijer, & Van der Ark, 2011). **P**(+ +) and **P**(- -) are symmetric matrixes containing the dichotomised score of an item ***i*** as a proportion of positive (+) and negative (-) responses by a person for pairs of items.

For a pair of items (***i***, ***j***) with responses (0, 1),) with $i \neq j$ the **P**(+ +) contains all joint proportions $\boldsymbol{P_{ij}}(11)$ of persons with a score of 1 for item ***i*** and ***j*** and the P(- -) contains all joint proportions $\boldsymbol{P_{ij}}(00)$ for persons with a score of 0 for both items (Sijtsma & Molenaar, 2002b). For polytomous items these matrixes contain the joint probabilities of passing **P**(+ +) and failing **P**(- -) pairs of item steps (Molenaar, 1997).

If $\boldsymbol{P_i(\theta) \leq P_j(\theta)}$ for each $\boldsymbol{\theta}$, and rows and columns are ordered by increasing $\boldsymbol{P_i}$ then the rows and columns of **P**(+ +) will be non-decreasing and **P**(- -) non-increasing. A violation indicates a conflict with IIO and the DM model, and similar to other methods these errors must be counted and assessed before acted on (Sijtsma & Molenaar, 2002b).

Test score reliability

Test-score reliability is defined by Van der Ark (Van der Ark, 2012, p. 13) as 'the degree of stability of a respondent's test score across independent replication of a test administration', denoted as $\mathbf{p_{xx}}$ reliability can be estimated for single administration tests through the calculations of joint cumulative probabilities. This is the probability of a person obtaining at least a score of ***x*** and at least a score of ***y*** on two independent administrations of the same item to that person.

Test-score reliability can be estimated for sample data through a number of well-known procedures such as Cronback's alpha and Guttman's lambda-2 coefficient but while useful general tests of reliability suffer from a number of limitations when applied to the internal structure of a test (Sijtsma, 2009). Specific tests have been developing for scale analysis including the MS statistic and the Latent Class Reliability Coefficient (LCRC), which can provide unbiased estimates of test-score reliability provided an unconstrained latent class model holds (Van der Ark, Van der Palm, & Sijtsma, 2011).

The H coefficient for measuring scalability

Once the MH model has been established, item-pair, item and total scale quality can be assessed through the coefficients $\boldsymbol{H_{ik}}$, $\boldsymbol{H_i}$ and $\boldsymbol{H}$ (Sijtsma et al., 2011). The coefficient $\boldsymbol{H}$ is 'a family of coefficients indicating MH scalability for pairs of items within a set, a single item with respect to the other items of a set and the set of items as a whole'(Mokken, 1997, p. 359). Scalability here refers to the extent to which items will be ordered hierarchically relative to one another. A low $\boldsymbol{H}$ coefficient value is also a good indicator of non-intersection IRFs and ISRFs should be considered when evaluating model fit, and when making the decision to remove an item (Molenaar, 1997).

The $\boldsymbol{H}$ coefficients $\boldsymbol{H_i}$ and $\boldsymbol{H_{ik}}$ describe the positive association between pairs of items on a MH scale. Here MH scale is defined by Mokken as 'a set of items which are all positively correlated with the property that every item coefficient ($\boldsymbol{H_i}$) is greater than or equal to a given positive constant $\boldsymbol{c}$ ($0 < \boldsymbol{c} < 1$)' (1997, p.361) and that all coefficients are nonnegative $0 \leq \boldsymbol{H_{ik}}$, $\boldsymbol{H_i}$, or $\boldsymbol{H} \leq 1$. Mokken defines the $\boldsymbol{H}$ Coefficient in terms of error probability on a deterministic scale $\boldsymbol{\pi_{ij}(1, 0) (I < k; \pi_i < \pi_j).}$ Error probabilities for the deterministic case are non-negative (response probabilities of either 0 or 1) and the function for error probability $\boldsymbol{e}$ for items ($\boldsymbol{i, k}$) in $\boldsymbol{I}$ is written as:

1. $e_{ik} = \pi_{ik}(1,0);\ e_{ik}^{(0)} = \pi_i(1 - \pi_k)\ if\ i < k;$
2. $e_{ik} = \pi_{ik}(0,1);\ e_{ik}^{(0)} = (1 - \pi_i)\pi_k\ if\ i > k;$

Where e_{ik} is the observed error and $e_{ik}^{(0)}$ is expected error for bivariate independence. It follows that the $\boldsymbol{H}$ coefficient for an item pair $\boldsymbol{H_{ik}}$ is then written as:

$$H_{ik} = 1 - \frac{e_{ik}}{e_{ik}^{(0)}}$$

In the deterministic case $\boldsymbol{H_{ij}} = 1$ and $e_{ik}^{(0)} = 0$ for a positive response probability, a high value of H corresponds with discriminating IRFs and a low $\boldsymbol{H}$ value with at least one non-discriminating IRFs. The $\boldsymbol{H}$ coefficient for a single item $\boldsymbol{H_i}$ can be given at a weighted linear combination function of $\boldsymbol{n - 1}$ items of $\boldsymbol{I}$:

$$H_i = 1 - \frac{e_i}{e_i^0} = \frac{\sum_{k \neq i}^{n} \pi_{ik}^{(0)} H_{ik}}{\sum_{k \neq i}^{n} \pi_{ik}^{(0)}}$$

For a full set of items $\boldsymbol{I}$ the coefficient can be defined in terms of an error ratio and as a linear combination of the $\boldsymbol{H_i}$ or $\boldsymbol{H_{ik}}$ functions where:

$$1.\quad e = \sum_{k<i} e_{ik}$$

$$2.\quad e^{(0)} = \sum_{k<i} e_{ik}^{(0)}$$

$$3.\quad H = 1 - \frac{e}{e^0} = \frac{\sum_{i<k}^{n} \pi_{ik}^{(0)} H_i}{\sum_{i<k}^{n} \pi_{ik}^{(0)}} = \frac{\sum_{i<k}^{n} \pi_{ik}^{(0)} H_{ik}}{\sum_{i<k}^{n} \pi_{ik}^{(0)}}$$

According to Mokken (1997) the $\boldsymbol{H_i}$ value is an indicator of the item's fit with respect to other items in $\boldsymbol{I}$ and can provide a measure for item goodness-of-fit in the monotonicity model. Using the $\boldsymbol{H}$ coefficient scales can be classified based on the association between the positive constant $\boldsymbol{c}$ where min($\boldsymbol{H_i}$; $\boldsymbol{i}$ = 1…,**n**) = c and $\boldsymbol{H} \geq$ c, 0 ≤ c ≤ 1 and $\boldsymbol{H}$ where 0.50 ≤ $\boldsymbol{H}$ is a strong scale, 0.40 ≤ $\boldsymbol{H}$ ≤ 0.50 a medium scale and 0.30 ≤ $\boldsymbol{H}$ ≤ 0.40 a weak scale. A lower bound of 0.30 for $\boldsymbol{c}$ is recommended as a cut-off point by Mokken with lower values representing unscaleable items.

Sijtsma et al. (2011) point out that there is a difference when it comes to assessing the scalability of polytomous items by means of coefficients $\boldsymbol{H_{jk}}$, $\boldsymbol{H_j}$ and $\boldsymbol{H}$. In the case of polytomous response categories, high values of $\boldsymbol{H}$ are not an adequate measure of whether a scale is hierarchical, rather they establish a person ordering. Coefficient $\boldsymbol{H}$ can provide an index for the precision of ordering persons by means of their total scores on the latent variable **θ** but $\boldsymbol{H}$ values are not an index of IIO as they cannot distinguish between sets of intersecting IRFs and ISRFs from sets of non-interesting IRFs (Sijtsma et al., 2011, p. 34). According to Sijtsma et al., (2011) when evaluating a scale with polytomous response categories, the first step is to determine if the ISRFs of items in the scale are monotone (i.e. form an ordinal scale), and then investigate the monotonicity separately through a specific IIO function.

Invariant Item Ordering (IIO)

Invariant Item ordering (IIO) is when item ordering according to popularity (mean score) is the same across different values of the latent trait **θ** which leads to the items forming a hierarchical scale (Sijtsma et al., 2011). When measuring a latent trait such as ability it may be desirable that items have cumulative structure which reflects a hierarchy of symptoms (or indicators) that are hypothesised to hold at an individual level.

Item Response Theory (IRT) models with IRF's that cannot intersect such as Mokken's DM imply IIO through the ordering of items. IIO can be checked by the rest score method and the P(+ +)/P(- -) matrices but only for dichotomous items. For polytomous items the aggregation of item response categories by ISRFs means that greater restrictions are required on the relationships between ISRFs and IRFs for models to imply IIO. In this case separate functions may be applied to test the IIO of scales which fit IRT models such as Mokken's Scale Analysis and Molenaar's extensions for polytomous items that do not include the necessary restrictions.

Ligtvoet, et al., (2010) provide the 'method manifest' IIO (MMIIO) for checking pairs of items, a method for investigating the IIO of polytomous items that is independent of a particular IRT model. In MMIIO $E\left(X_i \middle| R_{(i,j)}\right)$ is the estimated IRF for item ***i***. $R_{(i,j)} = X_+ - X_i - X_j$ is the rest score defined as the total score on k – 2 less the items ***i*** and ***j*** with realisation ***r*** = 0,…, (k - 2)*m*. If item means for pairs ***(i, j)*** are ordered $E(X_i) \leq E(X_j)$ then IIO implies $E(X_i|\theta) \leq E(X_j|\theta)$, for all **θ**. The previous function implies that $E(X_i|R_{(ij)} = r) \leq E(X_j|R_{(ij)} = r)$.

The function MMIIO investigates for each item pair ***(i, j)*** whether the expected score for item ***i*** given the rest score is smaller or equal than the expected score for item ***j***. For data analysis in the R statistical software package 'mokken' where the MMIIO function is implemented (Van der Ark, 2012), the sample mean scores $\overline{X}_i$ and $\overline{X}_j$ are used, with items ordered and numbered such that $\overline{X}_i \leq \overline{X}_j$. If the sample mean scores exhibit the reverse ordering for a value ***r*** or rest score ***R*** such that $\overline{X}_i \middle| R = r > \overline{X}_j \middle| R = r$ then a one-sided ***t***-test is run to check the null hypothesis that the item means are equal. If the null hypothesis is rejected for a value of ***r*** then items ***i*** and ***j*** are not invariantly ordered. For small samples a precaution against taking small violations seriously is to test sample reversals only then they exceed a minimum value *minvi.* A higher minimum value increases the probability that IIO is correctly identified, but also increases the probability that a violation (error) will be ignored. More item scores and larger sample sizes improve discrimination; sensitivity is worse for short tests but accuracy is greater. It has been recommended that the minimum value for ***m*** = 1 dichotomous items is 0.03 and for polytomous items ***m****0.03 is appropriate (Ligtvoet et al., 2010).

The coefficient H^T

For analysis of polytomous item sets where IIO is found, a generalised version of the coefficient $\boldsymbol{H^T}$ for dichotomous items can be computed to assess the degree to which a sample of persons agrees with the ordering of items. The coefficient $\boldsymbol{H^T}$ is similar to $\boldsymbol{H}$ but interchanges the roles of persons and items (Ligtvoet et al., 2010; Sijtsma et al., 2011).

For the $\boldsymbol{H^T}$ coefficient $\boldsymbol{X}$ is a data matrix of $\boldsymbol{N}$ respondents (rows) by $\boldsymbol{k}$ items (columns) with scores $\boldsymbol{x} = 0, \ldots, \boldsymbol{m}$ Vectors $\boldsymbol{X_g}$ and $\boldsymbol{X_h}$ contain the scores of respondents $\boldsymbol{g}$ and $\boldsymbol{h}$ on $\boldsymbol{k}$ items. Item score variation is Var($\boldsymbol{X_g}$) > 0, for $\boldsymbol{g} \in \{1,\ldots,\boldsymbol{N}\}$ (Ligtvoet et al., 2010). Cov($\boldsymbol{X_g, X_h}$) is the covariance between respondent $\boldsymbol{g}$ and $\boldsymbol{h}$, Cov_{max} ($\boldsymbol{X_g, X_h}$) is the maximum possible covariance given marginal distributions for the $\boldsymbol{k}$ items scores of respondents $\boldsymbol{g}$ and $\boldsymbol{h}$. The total score for item $\boldsymbol{i}$ is then $T_i = \sum_{g=1}^{N} X_g$ with vector $\mathbf{T}$ containing the $\boldsymbol{k}$ item totals, and vector $\mathbf{T_{(g)}} = \mathbf{T} - \mathbf{X_g}$ containing the $\boldsymbol{k}$ item total less the contribution of respondent $\boldsymbol{g}$ (Ligtvoet et al., 2010). Thus the coefficient H_g^T is defined as the weighted normalised covariance:

$$H_g^T = \frac{\sum_{h \neq g} Cov(X_g, X_h)}{\sum_{h \neq g} Cov_{max}(X_g, X_h)} = \frac{Cov(X_g, T_{(g)})}{Cov_{max}(X_g, T_{(g)})}$$

Coefficient H_g^T expresses the association between $\boldsymbol{k}$ item scores of respondent $\boldsymbol{g}$ and $\boldsymbol{k}$ item total minus the score of respondent $\boldsymbol{g}$. The Coefficient $\boldsymbol{H^T}$ wraps up the *N* person coefficients and is defined as:

$$H^T = \frac{\sum_g Cov(X_g, T_{(g)})}{\sum_g Cov_{max}(X_g, T_{(g)})}$$

Similarly to the coefficient $\boldsymbol{H}$, coefficient $\boldsymbol{H^T}$ provides a measure for goodness-of-fit for scales with polytomous item response categories (Ligtvoet et al., 2010). According to Ligtvoet et al. (2010) an $\boldsymbol{H^T} < 0.3$ indicates that the item ordering is too inaccurate to be useful; $0.3 \leq \boldsymbol{H^T} < 0.4$ means low accuracy; $0.4 \leq \boldsymbol{H^T} < 0.5$ means medium accuracy; and $\boldsymbol{H^T} > 0.5$ means high accuracy.

6.5. Participant recruitment and survey procedure

This part of Chapter 6 presents the Phase Two participant recruitment and survey procedures. The online survey was initially to be open during June 2013 for the end of Semester 1 break at the University of Tasmania, however the survey remained open from June until December 2013, giving 6 months for the recruitment of participants to the survey.

Recruitment started two weeks in advance of the survey opening. Participants were asked to register for the study through an online form provided on the research website. Registration collected a participant's name and email address, along with asking them to read and agree to conditions outlined in the social sciences consent form. This setup was preferred over paper based registration and consent form completion, as asking participants to complete paper forms and then email them to the researcher would be tedious, result in a high failure to comply rate, be difficult to keep track of and be open to human error if the study recruits a large number of participants. When the survey opened, all registered participants were notified by email (or other contact information if provided); notification emails contained a link to the survey with a unique access token for each participant. The open survey was accessible to the public and anyone wanting to participate was able to register and take part directly through the research website.

Once the survey opened, participants were still required to register before accessing the survey. By requiring participants to register it eliminated repeated survey responses and tracked who had completed the survey through the survey software. Upon registration participants were emailed a unique URL that then gave them access to the survey. To maintain anonymity, the information provided on registration was not linked to survey results stored by the software. Registration information was stored separately to survey results (in different database tables), and no access information such as the Token, time stamp or IP address information was recorded when participants submitted a survey questionnaire. On completion of the survey participants were thanked for their input into the study, and asked if they would be interested in participating in a Phase Three study.

6.6. Summary

This part of Chapter 6 presents a summary of the chapter. The chapter has been presented in four main parts. Part 6.2 provided background to the Phase Two study, presenting the aim and research questions, the paradigmatic assumptions which underpinned the study and a description of the profile of study participants. Part 6.3 provided a description of the methods for data collection, which was the research questionnaire. Part 6.4 presented a description of techniques for data analysis, which included exploratory data analysis techniques, techniques for scale development, the Mokken Scale Analysis technique and associated procedures for evaluating a scale. Part 6.5 presented the procedures for participant recruitment and for collection data using the questionnaire.

7. Phase Two results and discussion

7.1. Introduction

This chapter presents the Phase Two study results and provides a discussion of results guided by the study aim and associated research questions. The chapter is presented in two parts. Part two presents the results of data analysis, which include descriptive statistics, scale analysis and analysis of mobile phone use, and part three presents a discussion of results, guided by the study aims and research questions.

- Part 7.2 presents the results of data analysis, these include descriptive statistics, scale analysis and analysis of mobile phone use.
- Part 7.3 presents a discussion of results guided by the study aim and research questions.

7.2. Results

This part of Chapter 7 presents the analysis of survey data in the two sections. Section 7.2.1 provides an overview of the survey data through descriptive statistics and the data's goodness-of-fit. Section 7.2.2 presents scale analysis of question **5.b** measuring an international student's ability to use their mobile phone and **5.c** measuring their use of mobile phones to find support information. Section 7.2.3 presents results from further analysis of questions **5.b** and **5.c** to understand participants' mobile phone use.

7.2.1. Descriptive statistics

This section presents results from descriptive statistical analysis of response data for questions asked of participants in the online survey and measures describing the data's goodness-of-fit. A list of questions asked on the survey is provided in Figure 26.

Approximately one hundred and fifty (150) international students at the University of Tasmania were recruited to take part in the survey in 2013, but of those recruited only sixty-three (N = 63) provided complete responses to most questions on the questionnaire. Of those respondents the median age was 25 years old, the youngest in the sample 20 years and oldest 65 years respectively. These results are compared with those from the population data in Table 14 using measures of central tendency, Table 15 provides a comparison.

	Min	1st Qua	Median	Mean	3rd Qua	Max
Sample	19	23	25	26.25	28	65
Population	20	23	25	26.95	29	65

Table 15: Sample and population age measures of central tendency

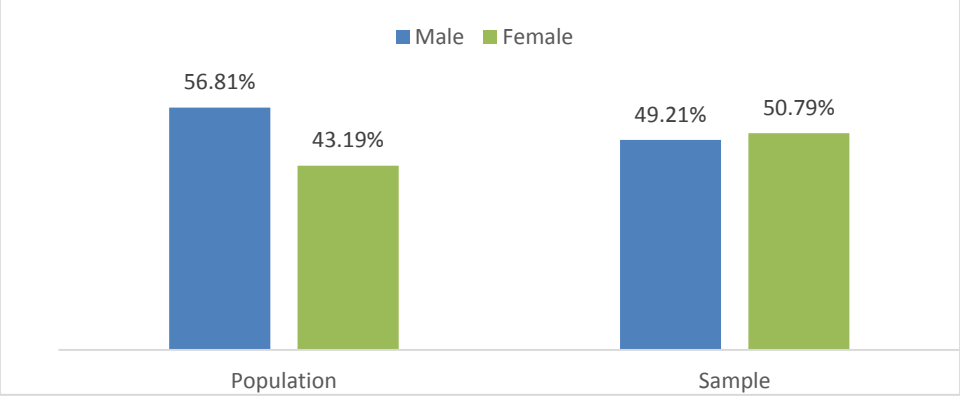


Figure 29: Proportion of international students by reported gender, sample compared with population

Figure 29 (using data from Table 57) compares the proportions of male and female international students in the sample to the population. Of those survey respondents 49.21% were male, and 50.79% were female, which while not exactly representing the population provide a good balance of genders in the sample.

For the majority of respondents (76%) English was not their first language (Table 58); 25 other languages were spoken by respondents and of those the largest proportion (21%) spoke Chinese, followed by Malay (6%) and Arabic (6%). This result was also reflected in the nationalities of participants where 24 different nations were listed in Table 59. The greatest proportion of respondents identified as being from China (21%), Malaysia (17%) and Singapore (13%) respectively with the rest distributed more sparsely among the other nations. The top five nationalities by proportion in the sample are compared with those from the population in Table 16.

	Population		Sample	
Country	**Frequency**	**%**	**Frequency**	**%**
China	1058	32.30%	13	20.63%
Malaysia	657	20.05%	11	17.46%
Singapore	349	10.65%	8	12.70%
South Korea	135	4.12%	5	7.94%
Saudi Arabia	93	2.84%	3	4.76%

Table 16: Sample and population comparison, proportion of international students from top five countries

Based on these demographics the sample appears to be a heterogeneous sample of international students that is gender balanced, but these demographics are similar to those provided by the University of Tasmania (section a), which suggests that the variety seen in the sample is at least (proportionately) representative of the particular population under study.

Prior travel experience – questions 2.a, 2.b and 2.c

Many of the respondents had prior travel experience with 74.6% having travelled overseas before coming to study in Australia. Roughly a third had lived overseas for some period of time, and 34.9% had lived in Australia prior to commencing their studies at the University of Tasmania.

Prior education – questions 2.d and 2.e

Most respondents had not undertaken prior courses at the University of Tasmania (63.49%), but some had undertaken prior study in courses including ELICOS, VET, at school or in other courses. 41% of respondents were currently enrolled in bachelor degree programs, 58% were enrolled in a postgraduate course at the university and one respondent was undertaking a diploma level course.

Current enrolment status – questions 2.f and 2.g

Roughly 83% of respondents were enrolled in Hobart, while 17% were enrolled at a Launceston campus. Most respondents were in their first year of study (42.86%) and a large

proportion in their second (23.81%) or third (22.22%) year of study at the university, while the remainder were in their third year or more (Figure 30).

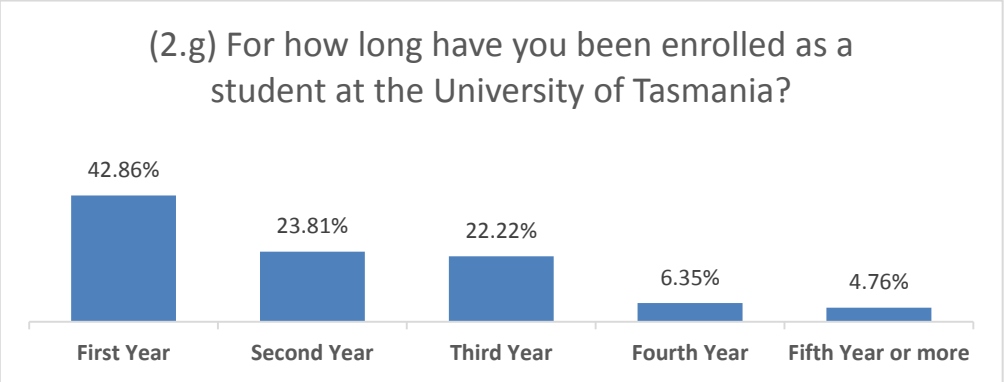


Figure 30: Proportion of responses to categories for question 2.g

Family and living arrangements – questions 2.h to 3.c

Most respondents did not have family living in Australia (52.38%) but a significant number did (47.62%) (Table 65). Of those with family in Australia, half (52.38%) have family in Tasmania. On average respondents had been living in Australia for 21.22 months, with the maximum length of time being 96 months and minimum 1 month, and the most frequent length of time spent in Australia was 24 months, shown in Table 66. Responses to questions about respondents' main sources of income are listed in Table 67 and summarised in Figure 31.

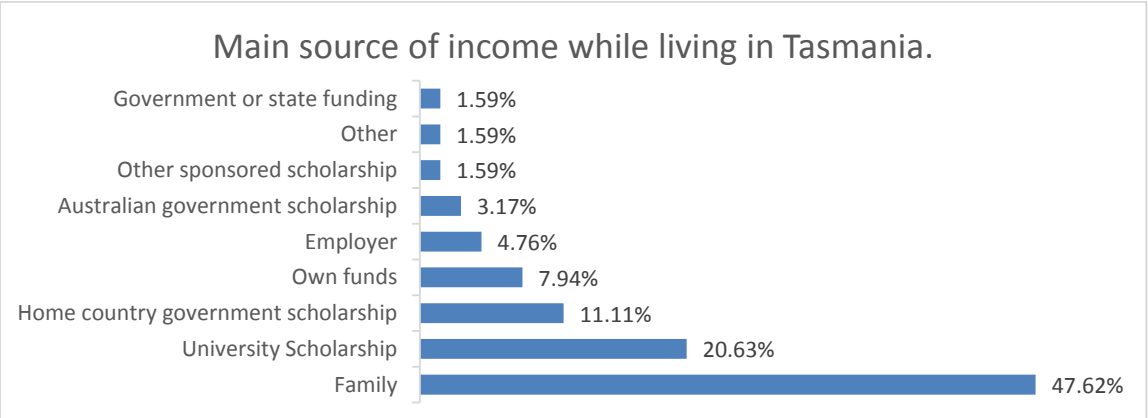


Figure 31: Main sources of income for respondents while living in Tasmania

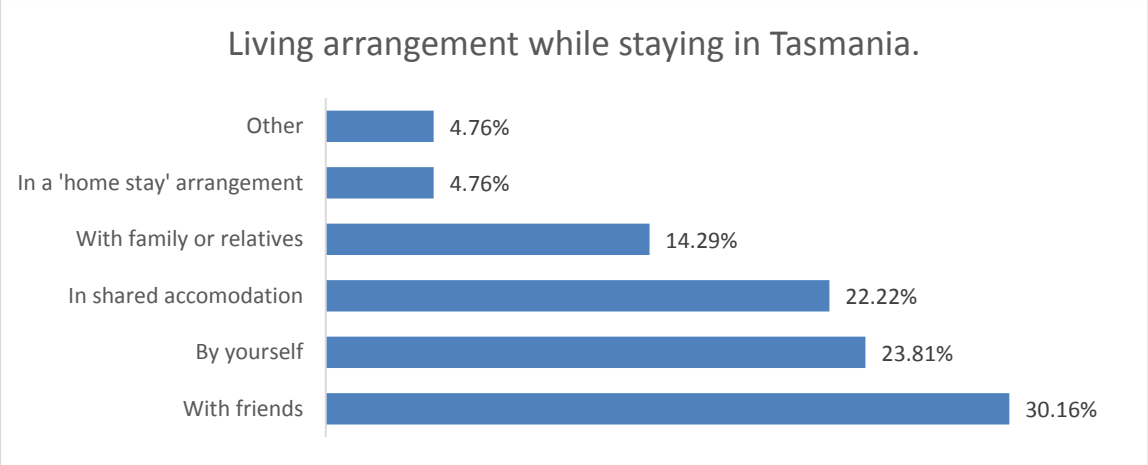


Figure 32: Living arrangements of respondents staying in Tasmania

Results from questions asking about respondents' living arrangements while staying in Tasmania are listed in Table 68 and summarised in Figure 32. A majority of respondents reported living with friends (30.16%) while many lived by themselves (23.81%) or in shared accommodation (22.22%). Living with family or in 'home stay' arrangements were less common and some respondents had other arrangements.

ICT ownership and access – questions 3.d to 3.g

Responses to questions about ICT access are displayed in Table 69 and results summarised in Figure 33. Most respondents had internet access at home (90.48%) and about half had a desktop PC (50.79%) and/or a landline telephone (42.86%).

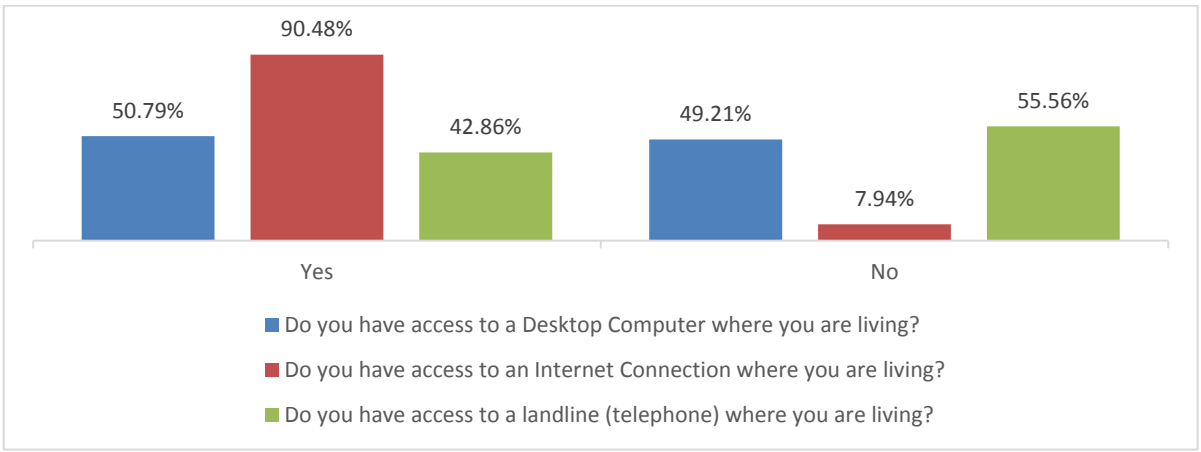


Figure 33: Proportion of respondents with access to a desktop PC, internet, or landline where they are living

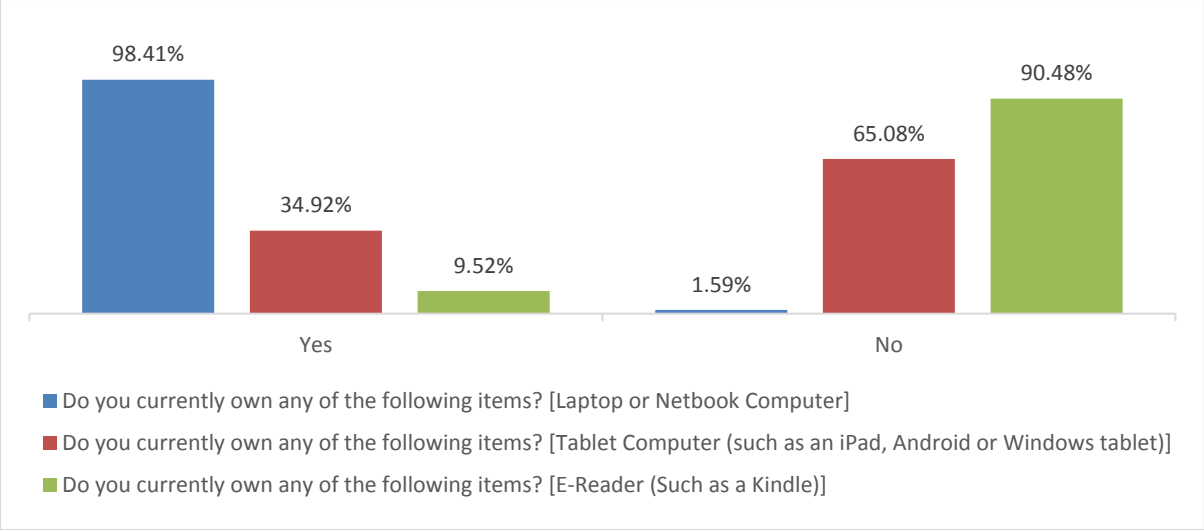


Figure 34: Responses to questions about ICT ownership

Responses to questions about ICT ownership are listed in Table 70 and summarised in Figure 34. The majority of respondents owned a laptop or netbook (98.41%), but less than half owned a tablet computer (34.92%) and few owned an e-reader (9.52%).

Mobile phone ownership – questions 4.a to 4.g

All respondents to the survey owned a mobile phone. Table 71 shows that of those 26.98% owned more than one device. Table 73 and Table 74 show that respondents reported owning a 'smart phone' (88.89%) while the rest had other kinds of devices (11.11%).

Results in Table 71 show that on average a respondent has owned their phone for 16.55 months, the maximum length of time being 60 months and the minimum being 1. The most common length of time was 3 months. On average respondents reported spending $48.25 each month on their mobile phone bill. The maximum paid was $110 and the minimum $10, and the most common amount was $30 a month.

Mobile phone use – questions 5.a and 5.d to 5.h

When asked to rate their ability to use their mobile phone results in Table 75 show that most respondents reported being very good (39.68%) or good (39.68%). Some felt that they were okay (15.87%) and one felt that they were very poor users (1.59%).

Table 78 lists results for questions **5.d**, **5.e** and **5.g** about different kinds of mobile phone use, these are summarised in Figure 35. From the summary it is clear that a significant number of

respondents had used their phones to coordinate a social activity (87.30%), to contact people (82.54%) and for sharing information (73.02%) within the last 30 days.

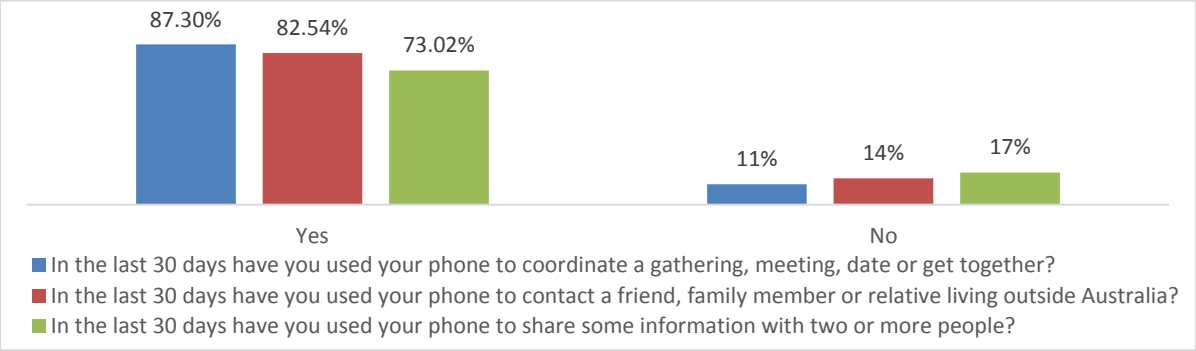


Figure 35: Proportion of responses (yes or no) to questions 5.d, 5.e, and 5.g

For question **5.h** respondents were asked to rate how losing their mobile phone would affect them on a five-point scale (1 – not significant, 5 – very significant), results are listed in Table 79. The results are summarised in Figure 36 which shows that a majority of respondents said that losing their mobile phone would have a significant adverse effect, with 87.30% of responses rating the significance three or more. Few said that this would not be an issue, with 12.70% of respondents rating the significance two or less.

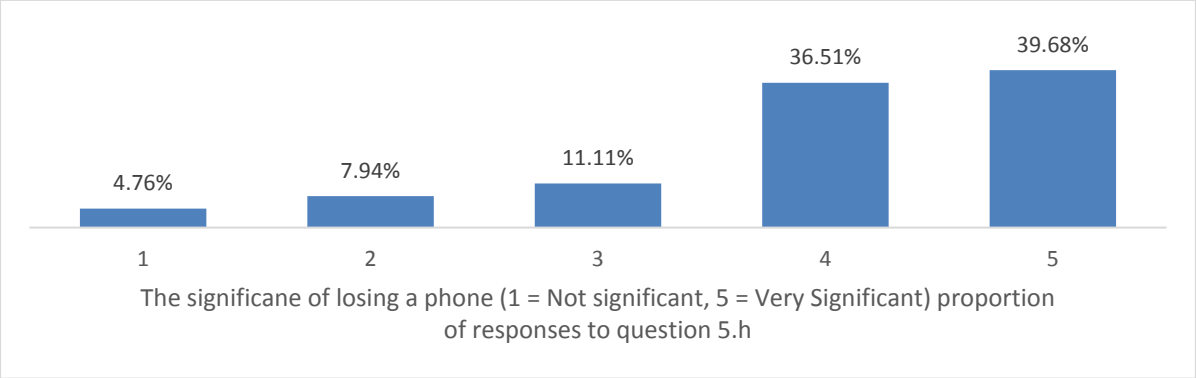


Figure 36: Proportion of responses to each category (1 to 5) in question 5.h

7.2.2. Scale analysis for questions 5.b and 5.c

This section presents the analysis of items for questions **5.b** and **5.c** using Mokken Scale Analysis (MSA). To evaluate whether a series of test items forms a Mokken Scale a series of tests can be administered to evaluate the necessary underlying assumptions, which include:

1. Item unidimensionality.
2. Local stochastic independence.
3. Latent monotonicity (Monotone Homogeneity).
4. Noninteresction (Double Monotonicity).

To test the reliability of scales developed for this questionnaire MSA of questions **5.b** and **5.c** was conducted using the R statistical software package (R Core Team, 2016) and the 'Mokken' R package (Van der Ark, 2007, 2012). Analysis followed the steps outlined by Van der Ark (2007, 2012) in the following order:

1. Testing model fit and reliability
2. Evaluate the data scalability and coefficients $\boldsymbol{H}$
3. Test for Invariant Item Ordering (IIO) and the coefficient $\boldsymbol{H^T}$

Adjustments can then be made to the scales and the participants given a score for further analysis. Firstly, results from fifty-eight (N = 58) respondents who completed all items for questions **5.b** and **5.c** (both 8 item scales) were loaded into the R statistical software package for analysis. Different approaches may be taken towards N/A values, and the approach adopted here was to not include those responses in the analysis.

Test score reliability

Table 17 displays results from four reliability tests generated for sets of items in questions **5.b** and **5.c** respectively using the R 'Mokken' package (Sijtsma et al., 2011). All reliability tests run return a value greater than 0.80, suggesting a strong relationship between items on the scale. The MS and LCRC results will be higher for sets of item scores that are not completely unidimensional (Van der Ark, 2012).

Test	Question 5.b	Question 5.c
MS	0.8498719	0.8313926
Alpha α	0.8264717	0.8281779
Lambda 2	0.8447206	0.8346215
LCRC	0.8476604	0.8764741

Table 17: Results of reliability tests for items in questions 5.b and 5.c

Monotonicity model fit

Model fit can be tested through evaluation of item monotonicity models – Monotone Homogeneity (MH) and Double Monotonicity (DM). The R statistical software (R Core Team, 2016) using the package 'Mokken' (Van der Ark, 2007, 2012) provide functions 'check.monotonicity' and 'check.restscore' to test the MH and DH assumptions for item response data. Table 87 and Table 88 show the summarised output for the 'check.monotonicity' function run on Questions **5.b** and **5.c** item response data. The table headings may be interpreted as follows:

- **Item** is an alias for the question,
- **ItemH** is the items ***H*** coefficient value,
- **#ac** is the number of active pairs, (N*(N -1) /2),
- **#vi** the number of manifest monotonicity violations (greater than minvi),
- **#vi/#ac** average number of violations of manifest monotonicity per active pair,
- **maxvi** the largest violations of manifest monotonicity,
- **sum** is the sum total of violations greater than minvi,
- **sum/#ac** the average violation per active pair,
- **zmax** is the maximum test statistic,
- **#zsig** is the number of significant violations.
- **Crit – CRIT** is an experimental summary statistic (Van Schuur, 2003)**.**

The 'check.monotonicity' tables show results for a range of values for the property 'minsize' which defines the minimum size of a rest score group. Molenaar (1997) suggests testing different values for rest group size to find a balance between too few groups where a

violation could be masked or too many where the fractions per group will become instable. The values 10, 15 and 20 were tested for question 5.b and results suggest that the value 10 seemed to provide a good fit. The values 5, 10 and 15 were tested for question 5.c where results suggested the value 5 provided a good fit.

For question 5.b (**minsize** = 10) no significant errors (**#zsig**) are reported, and no CRIT values above 80 with the exception of item Q43. Item Q43 also has the highest (**#vi**) of 8 and (**zmax**) of 0.9. This indicates that item Q43 may be violating the MH model, the suspicion is reinforced by checking the (**ItemH**), for item Q43 – this is 0.24 which is less than the acceptable 0.3 threshold indicating that it may also be unscalable.

For question 5.c (**minsize** = 5) there are no significant errors (**#zsig**) with the exception of item Q57. Several items have a CRIT well above 80, deemed an unacceptable level and many items show violations of manifest monotonicity (**#vi**). But the number of violations greater than minvi (**sum**) is relatively low in most cases, as is the average violations per active pair (**sum/#ac**). Items Q.57 and Q55 show the most error, but also the most active pairs (#ac); this indicates that if one is violating monotonicity it may be affecting the scores of other items. Error here may also be attributed to sampling error and Molenaar notes that for most real datasets, many errors will be observed, with most having numerically small ***z*** values. Checking (**ItemH**) shows that only item Q57 has a value below the 0.3 threshold of 0.26 while all other items are scalable.

For both scales 5.b and 5.c these results indicate that manifest monotonicity appears to hold, but that certain items may be unscalable and causing violations of the model. The next step is potentially removing items Q43 and Q57 which may significantly reduce the observed violations, but firstly it is worth specifically testing the scalability of items on the two scales.

Scalability

An Automatic Item Selection Procedure (AISP) originally developed by Mokken can also be used to partition items into Mokken scales using the 'Mokken' package to investigate the latent monotonicity. AISP is a sequential clustering algorithm which aims to select from the given pool of items the largest subset of items that measure the same attribute while satisfying scaling criteria. The algorithm partitions items into mutually exclusive, unidimensional clusters that contain sufficiently-discriminating items (J. Hendrik Straat, Van der Ark, & Sijtsma, 2013).

More recently, a stricter more computationally intensive variation of AISP has been modelled after stepwise regression analysis using a genetic algorithm which is referred to in the R package 'Mokken' as GA (J. Hendrik Straat et al., 2013). Straat et al., (2013) conclude that GA is able to provide a better automated item selection for MSA but that ideally both algorithms should be applied and the best resulting scales then be evaluated for model fit and scalability.

The AISP and GA sort procedures were run on items for questions **5.b** and **5.c** separately, and the results are displayed in Table 18. It is clear that both algorithms return corresponding results, for question 5.b items Q44 to Q 50 form a scale 1 while item Q43 is excluded in scale 0, similarly for question 5.c item Q57 is excluded (Scale 0) from the main scale (scale 1).

Item	AISP	GA	Item	AISP	GA
Q43	0	0	Q51	1	1
Q44	1	1	Q52	1	1
Q45	1	1	Q53	1	1
Q46	1	1	Q54	1	1
Q47	1	1	Q55	1	1
Q48	1	1	Q56	1	1
Q49	1	1	Q57	0	0
Q50	1	1	Q58	1	1

Table 18: Automatic item selection for items in 5.b and 5.c

Again these results confirm that items Q43 and Q57 may be unscalable and it warrants checking the ***H*** coefficients to confirm the two seven item scales recommended by the algorithms.

Coefficient H

The ***H*** Coefficients for both scales were calculated as shown in Table 80, which displays the coefficient values for items and their Standard Error (se). Results show that both scales meet the requirement of positive $\boldsymbol{H_{ij}}$ coefficients and Monotone Homogeneity (MH), but the $\boldsymbol{H_i}$ coefficients for two items (item Q43 on scale **5.b**, and item Q57 on scale **5.c**) fall below the lower bound $\boldsymbol{c}$ = 0.3 recommended by Molenaar (1997) with $\boldsymbol{H_i}$ = 0.244 and $\boldsymbol{H_i}$ = 0.264

respectively. The scalability ***H*** coefficients displayed in Table 81 for both scales are greater than 0.4 which is a good sign that the items are scalable but ideally ***H*** coefficients over 0.5 are desirable for a strong scale, according to Mokken (1997).

The results from ***H*** coefficient tests confirms the results for both AISP and GA algorithms, items Q43 and Q57 are both below the ***c*** = 0.3 threshold and significantly so. If the standard error **se** = -0.109 for Q43 and **se** = -0.104 for Q57 is taken into account, both items can be deemed unscalable. The next step is to remove items Q43 and Q57 from the scales and then re-evaluate the ***H*** coefficients for the two new seven item scales.

Table 82 lists the coefficient H_{ij} and H_i values for the new scales, and in all cases results for H_i show that item coefficients are above the ***c*** = 0.3 threshold with standard errors taken into account. The ***H*** coefficient values for both scales (Table 83) are 0.557 with **se** = -0.082 and 0.546 with **se** = -0.069 respectively. An ***H*** value ≤ 0.5 reflects a strong scale, with standard errors taken into account both scales fall within $0.4 \leq H < 0.50$, which reflects a medium scale according to Mokken (1997).

Monotonicity model fit for seven item scales and sampling error

With items 43Q and 57Q removed a revaluation of latent monotonicity for scales **5.b** and **5.c** was conducted, and results are displayed in Table 89 and Table 90 respectively. Results show a significant improvement for both scales and reduction in violations (**#vi**) with none being significant (**#zsig**). Error is still present in both scales with significantly more in **5.c** than **5.b** but given that the sample size is relatively lower than the recommended sample sizes for MSA (approximately 250 as a guiding figure) error is likely to be sampling error (J. H. Straat, Van der Ark, & Sijtsma, 2014).

Invariant Item Ordering (IIO)

According to Sijtsma et al., (2011, p. 31) 'items form a hierarchical scale when the ordering of the items according to their popularity (or mean score) is the same across different values of the latent trait' a property known as Invariant Item Ordering (IIO). If IIO is established for a scale, a hierarchy can be inferred from the total score of participants, and used as an indicator for different levels of the latent trait or summaries for a set of responses, ordered from low to high intensity, a property known as the stochastic ordering of the latent trait by the total test score (SOL). However it must be noted that in the case of Mokken Scale

Analysis for polytomous items, only the presence of *weak SOL* may be estimated (Van der Ark & Bergsma, 2010).

In the case for polytomous items Ligtvoet et al., (2010) suggest that IIO may be investigated using the function method manifest IIO (MMIIO), a function that operates independently from the assumptions of different Item Response Theory (IRT) models. As the items for questions **5.b** and **5.c** were polytomous, having more than two response categories (in this case **5.b** has five and **5.c** has three), the IIO of both scales may be investigated by using the MMIIO function in the R package 'Mokken' (Sijtsma et al., 2011). The R package 'Mokken' (Van der Ark, 2012) was used to run the MMIIO test. Result are presented in Table 84 for items in **5.b** and Table 85 for **5.c** respectively. The main difference between the MMIIO table and previous tables is the use of the ***t*** statistic rather than the ***z*** and (**tmax** and **#tsig** rather than **zmax** or **#zsig** etc.).

Results show that for scale **5.b** an IIO is present, no significant errors (**#tsig**) were present and the few violations detected appear not to be significant (**#vi**). The 'backwards selection' algorithm also found no issue grouping all items into the same scale. This result is confirmed by the $\boldsymbol{H^T}$ result in Table 86 where a value of 0.643 indicates item ordering as a relatively high accuracy. For scale **5.c** no significant errors are present (**zsig**) but there are a number of violations per item (**#vi**) with high maximum values (**tmax**). Most CRIT values (**crit**) are also over 80 which as previously stated is not a good sign. The 'backwards selection' algorithm places all items in the same scale with no violations detected. Violations may be the result of sampling error as previously mentioned and not the scale itself. But Table 86 shows that the $\boldsymbol{H^T}$ coefficient for scale **5.c** returned a value of 0.245 which suggests that item ordering is too inaccurate to be useful and an IIO cannot be confirmed.

7.2.3. Mobile phone use

This section presents the results from questions **5.b** and **5.c** along with results for further analysis investigating the aims and research questions that informed the study. While 63 responses were collected, here only 58 will be considered (N = 58) due to N/A values in parts of question **5.b** and **5.c** and this means that treatment of N/A values is consistent with the previous section.

Table 76 lists the raw frequency counts of responses by participants to question **5.b** and Table 77 lists the frequency counts for question **5.c**. Responses for question **5.b** were weighted with a value 1 to 5 as shown in Table 19 with the value 1 indicating high levels of use and 5 the least (being none); results in the table are ordered by total score. Results for question **5.c** are shown in Table 20, and responses to each category were scored 1 for Yes, 2 for Uncertain and 3 for No. Items are also ordered by total scores lowest to highest.

Item/category	**Several times a day**	**Once a day**	**A few times a week**	**Less often**	**Never**		
	Value=1	Value=2	Value=3	Value = 4	Value=5	Sum	Z
Q50 Record video	1	6	27	128	65	227	0.66
Q49 Record audio	3	4	27	120	70	224	0.65
Q44 Apps	9	14	54	72	30	179	0.47
Q48 Take a picture	18	12	72	32	10	144	0.33
Q45 Email	27	10	33	32	35	137	0.31
Q43 Text message	27	12	51	32	0	122	0.25
Q47 Social media	36	8	24	20	25	113	0.21
Q46 Web browser	37	6	24	20	25	112	0.21

Table 19: Standardised score totals for question 5.b

Item/Category	**Yes**	**Uncertain**	**No**		
	Value = 1	Value = 2	Value = 3	Sum	Z
Q57 Employment	17	26	84	127	0.53
Q51 Accommodation	25	4	93	122	0.49
Q54 Health	22	20	78	120	0.47
Q55 Support services	21	24	72	117	0.45
Q53 Finances	33	4	69	106	0.37
Q58 Food or other essential items	32	20	48	100	0.32
Q52 Transportation	40	4	48	92	0.26
Q56 Your study	43	6	36	85	0.21

Table 20: Standardised score totals for question 5.c

Results of scale analysis in the previous section indicated that responses from **5.b** can reliably be ordered lowest to highest for items, and can be used to order respondents accordingly. Responses for **5.c** may be used to order items and respondents at a group level but cannot reliably order individual respondents due to the absence of Invariant Item Ordering (IIO).

For question **5.b** the minimum score an item can receive is 58 (every respondent giving the value 1 in a sample of N = 58 respondents) and the highest 315 (every respondent giving the value 5) and for question **5.c** 58 is the lowest and 189 the highest (every respondent giving the value 3). The normalised scores (in the last column - **Z**) are calculated using the max–min function (Milligan & Cooper, 1988):

$$z = \frac{x - x_{min}}{x_{max} - x_{min}}$$

..where $\boldsymbol{X}$ is the item score, $\boldsymbol{X_{max}}$ is the maximum expected score (315 or 189) and $\boldsymbol{X_{min}}$ the minimum (58). The max–min function is similar to the standard normal distribution (Howell, 2008, p. 111), but scores are distributed on a scale between 0 and 1. In Table 20 a score of 0 would mean that all responses were 'Yes' with a value of 1 making $\boldsymbol{x}$ = 58, $\boldsymbol{x_{min}}$ = 63 and $\boldsymbol{x_{max}}$ = 189.

Scores were also calculated in this way for individual respondents for items in scales **5.b** and **5.c** (each containing seven items), items Q43 and Q57 were excluded from the scales following Mokken Scale Analysis (MSA). Table 21 summarises the scores for respondents along with those for questions **3.a**, **4.d**, **5.a** and **5.h** for comparison. Figure 26 provides information about the particular questions.

Question	Average	Median	Mode	Max	Min	Sdiv	Unit Type
3.a	21.72	18.00	6.00	96.00	1.00	21.11	Continuous
4.d	16.58	9.00	3.00	60.00	1.00	16.08	Continuous
5.a	1.79	2.00	1.00	5.00	1.00	0.85	Ordinal
5.b	0.45	0.39	0.36	1.00	0.00	0.22	Ordinal
5.c	0.41	0.36	0.00	1.00	0.00	0.33	Ordinal
5.h	3.97	4.00	5.00	5.00	1.00	1.15	Ordinal

Table 21: Measures of central tendency for questions about mobile phone use and time

Question **3.a** asked how many months a respondent had been staying in Tasmania, **4.d** asked how many months they had owned their current mobile phone, **5.a** asked respondents to rate their ability to use their phone (1 being 'very good', 5 being 'very poor') and **5.h** asked respondents to rate from 1 to 5 how significantly losing their mobile phone would affect their life.

To look at the relationships between these variables, the strength of relationships between variables were calculated using Pearson's Product-Moment Correlation (Howell, 2008) for continuous variables and Spearman's Rank correlation coefficient (Pirie, 2004) for ordered, categorical variables. Results for variable comparisons are displayed in Table 22 as a contingency table of correlation coefficients. Here the unit types displayed in Table 21 are important, as they have an effect on the data distribution and thus the correlation values. For comparison Table 22 displays result for both forms of correlation analysis on all variables, and it is clear that there are differences between the two. This variation may be the result of skewed variable distributions (common with ordinal variables), outliers in the data or the small sample size. Since only variables **3.a** and **4.d** are continuous and there is minimal variation between their Pearson and Spearman correlation coefficients, the results of the Spearman's Rank correlation coefficient will be used as it is a more robust technique.

According to Howell (2008) as the sample size is approximately 50, a minimum a score of 0.354 (+/-) is required to indicate a potential relationship. Results show that the strongest positive relationships are between questions **3.a** and **4.d** (months living in Tasmania and months owning current mobile phone) and **5.b** and **5.c** (mobile phone use and finding information using a mobile phone).

Spearman's	3.a	4.d	5.a	5.b	5.c	5.h
3.a						
4.d	0.536					
5.a	0.081	0.118				
5.b	0.236	0.189	0.327			
5.c	0.229	0.284	0.439	0.568		
5.h	-0.332	-0.122	-0.282	-0.300	-0.278	

Pearson's	3.a	4.d	5.a	5.b	5.c	5.h
3.a						
4.d	0.514					
5.a	0.024	0.093				
5.b	0.130	0.337	0.399			
5.c	0.188	0.373	0.464	0.667		
5.h	-0.138	-0.080	-0.264	-0.369	-0.273	

Table 22: Variable Correlation Coefficients contingency table

Notable relationships are present between questions **3.a** and **5.h,** months**5.a** and **5.b**, **5.a** and **5.c**, **5.b** and **5.h** respectively. That there is a strong relationship between perceived ability and measured ability (**5.b** measures ability to use a phone) and need (**5.c** measure using a phone to find information about current needs) provides additional confirmation to support the two scales. There is a weak relationship between **4.d** and **5.b** indicating that time owning a phone may be associated with ability, and **5.b** and **5.h** which indicates that the impact of losing a phone (**5.h**) may be related to a person's ability to use that phone (and possible reliance on it). The negative association observed is the product of a decreasing **5.b** score (a lower value means higher use) and an increasing **5.h** score (a high score means losing a phone is more significant); this creates an inverse relationship.

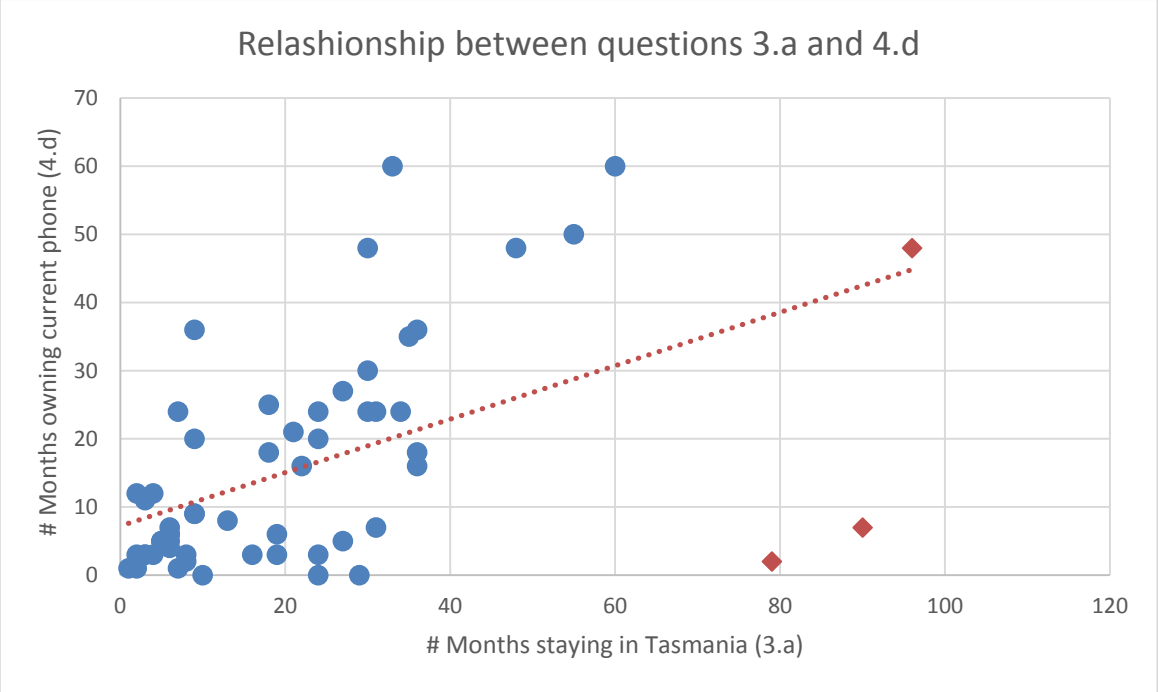


Figure 37: Months staying in Tasmania (3.a) vs months owning current phone (4.d)

There is a strong relationship between **3.a** time spent in Tasmania and **4.d** length of phone ownership. In the case of questions **3.a** some outliers were present in the response data as shown in Figure 37 – a scatter plot of response pairs to questions **3.a** and **4.d**. The removal of these responses (three in total, coloured orange on the graph) improved the correlation coefficient between questions **3.a** and **4.d** from 0.536 up to 0.598 which is an improvement. However, their removal adversely affected the correlation coefficients between other variable pairs including those between **3.a** and other variables.

7.3. Discussion

This part of Chapter 7 presents a discussion of the results in line with the Phase Two study aim and associated research questions reproduced here:

- **RQ1:** To what extent and in what ways are mobile phones used by international students?
- **RQ2:** To what extent are mobile phones used to access support information?
- **RQ3:** To what extent do international students rely on their mobile phones?

- **RQ4:** Is there a significant difference between those with smart phones and those without?
- **RQ5:** Is there a significant difference between 'first year' international students and those in later years?

Results show that the sample, despite being of a small size, is a good fit to the international student population at the University of Tasmania. Key features including age, gender and nationality are shown to align relatively well between the sample and the population of interest. Generalisations will be limited, and observations from this exploratory study are worth investigating on a larger sample of international students. Here discussion shall focus on the sample of 58 respondents (N = 58) who gave full responses to questions **5.b** and **5.c.**

Of the two scales in the questionnaire items from **5.b** reliably form a hierarchical scale to measure a respondent's ability to use their mobile phone, and the scale meets the requirements of both the Monotone Homogeneity and Double Monotonicity models (Scale **5.b**). For question **5.c,** items have a high level of reliability but only form a weak hierarchical scale, and items meet the requirements of Monotone Homogeneity but not those of Double Monotonicity as items do not have IIO and are not reliable enough to order individual respondents (Scale **5.c**). This issue appears to arise from the small sample size and a larger sample would likely reduce the perceived model violations, or it may be an issue with the scales design; further testing and development is required to understand these issues. At a group level, results from both scales are useful to describe respondents' ability to use their mobile phones (**5.b**), and their use of the phone for finding information about particular needs (**5.c**). In this discussion total scores for individuals are the sum scores for seven items on the two scales, excluding items Q43 and Q57, and when discussing the sum scores of scale items these are not excluded. It is very interesting to note that responses to Q43 text messaging, and Q57 employment, were very different to those for other items, but further investigation in another study is needed to shed more light on these relationships.

The extent to which international students use their mobile phones (RQ1) is best demonstrated through results from a number of questions on the survey, but it is clear from the results of question **5.b** that the phone was used frequently in a number of ways. Standardised item scores in Table 19 are summarised in Figure 38. The results show that mobile phones were most frequently used for web browsing (Q46) and social media (Q47)

and used least for recording audio (Q49) and video (Q50). Overall, most functions were used frequently, with the exception of audio and video recording, which were not frequently used. That web browsing and social media would be more frequently used than text messaging (Q43) is an unexpected result, indicating that having internet available on the mobile phone would be important to these international students.

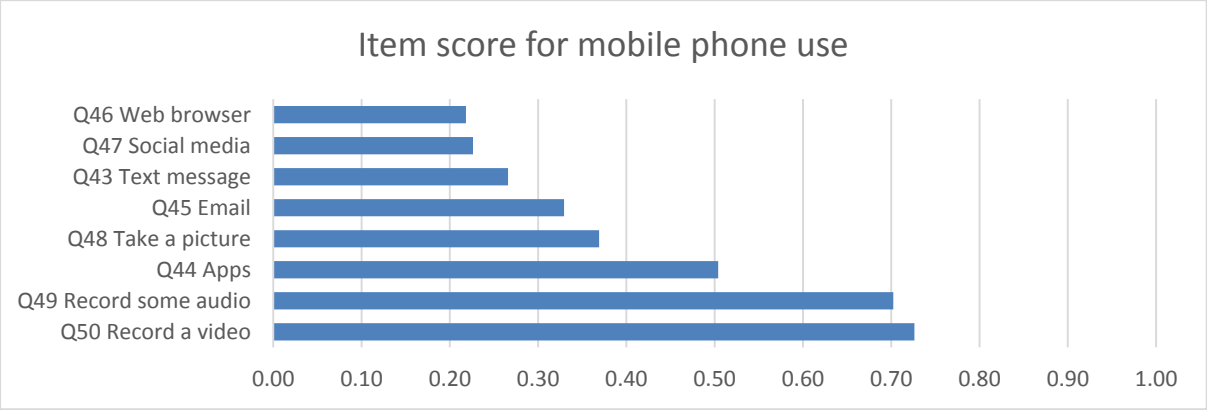


Figure 38: Summary of total item scores for question 5.b

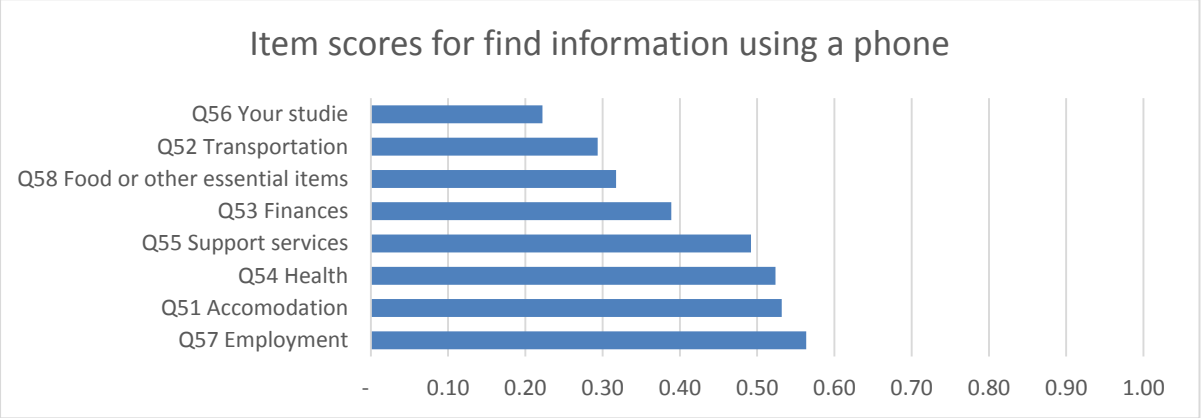


Figure 39: Summary of total item scores for question 5.c

Figure 39 presents a summary of the standardised scores for question **5.c** in Table 20.The summary of results shows that the variance between items scores is smaller than those in **5.b** which is supported in that the items do not form a hierarchical scale. Item Q56 'Looking for information about study' was the most popular kind of information to look for using a phone,

while Q57 'Information about employment' was the least popular. Clearly it is study that is on the minds of these international students.

A comparison of scores for respondents on both questions is presented in Table 21, and Table 22 presents the correlation between the two sets of scores. A correlation coefficient of 0.568 is a good indication that responses to both questions are related. The average score of respondents are similar, being 0.45 and 0.41, and the median 0.39 and 0.36 respectively, with standard deviations 0.22 and 0.33. But while the mode for **5.b** is 0.36 question **5.c** has a mode of 0 (a score of 0 indicates they replied 'yes' to all item in question 5.c). So, despite the similarity between total items scores in Figure 39, individual responses vary more in question **5.c** between persons, and less by items. As already observed, this may be an issue with the small sample size more than anything else. To answer RQs 1 and 2, the results for questions **5.b** and **5.c** show that international students use their phones extensively and that information generally is looked for using the phone, but this varies by the individual and not the kind of information being searched for. When it comes to an individual's ability to use their phone this can be reliably measured using the scale developed from question **5.b**.

Results for questions **5.d**, **5.e** and **5.g** also show that over 70% of respondents said that they had used their phone to stay-in-touch, coordinate activities and/or share information within the last thirty days. These results help confirm that international students in this sample do use their mobile phones extensively while staying in Tasmania.

RQ4 is interested in whether having or not having a smart phone will detrimentally affect phone use. Having or not having a smart phone emerged in the Phase One study as a distinguishing issue when it came to what an international student could or could not do on their phone, which affected their ability to communicate with other people. RQ4 can be addressed by comparing the result of questions **4.e** with scores from questions **5.b** and **5.c.** Of the 58 respondents, five indicated in responses to question **4.e** that they did not own a smart phone, and this is confirmed by their response to question **4.f** where they selected the phone type of 'Other'. Table 23 compares a selection of responses by those participants to relevant questions. It is clear that their responses to question **5.b** and **5.c** are very similar, with the scores being 1 or very close to 1 indicating the lowest ability to use their phone, and for finding information with their phone. To compare these respondents' scores with others on

5.b and **5.c,** Figure 40 plots scores for all participants jointly on a bi-plot for visual comparison. Scores for the five respondents are highlighted in orange.

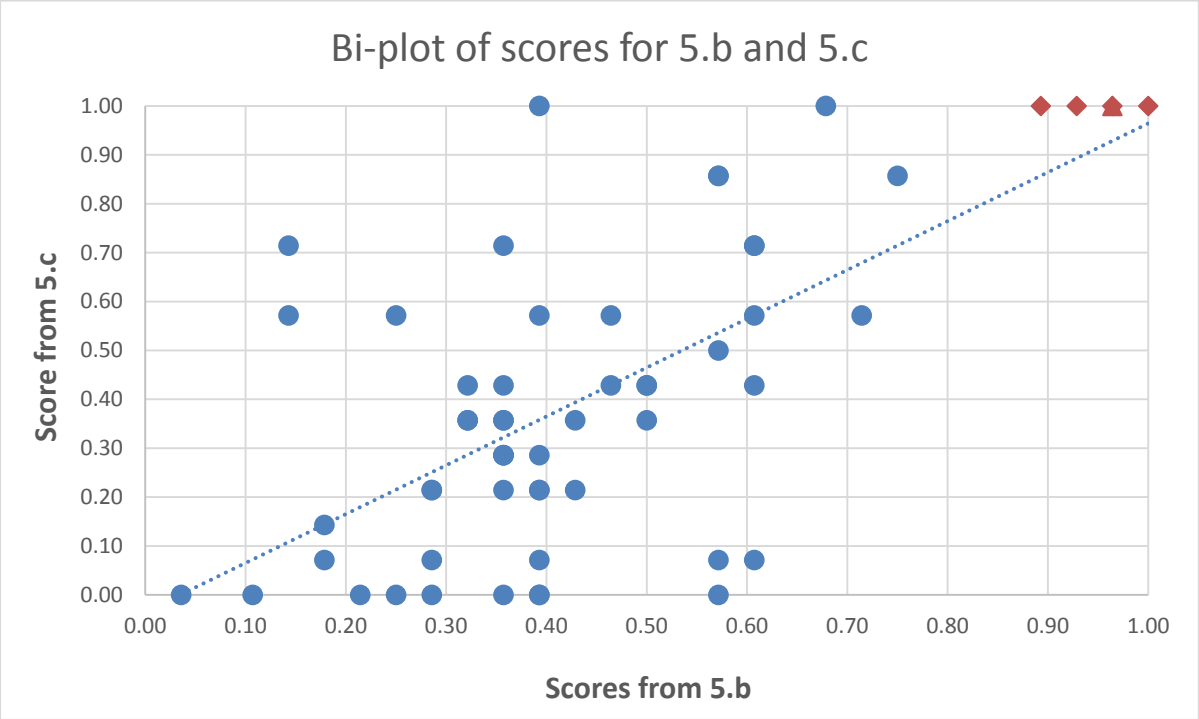


Figure 40: Bi-plot comparing total respondent scores from questions 5.b and 5.c

Gender	Age	Country	3.a	4.d	4.e	4.f	5.a	5.b	5.c	5.d	5.e	5.g	5.h
Male	25	Nepal	5	5	No	Other	2	0.89	1.00	No	Yes	Yes	4
Male	24	Malaysia	33	60	No	Other	2	0.96	1.00	Yes	No	No	3
Female	28	United States	8	3	No	Other	3	0.96	1.00	No	No	Yes	1
Female	27	Italy	9	36	No	Other	2	1.00	1.00	Yes	Yes	No	2
Male	23	China	9	20	No	Other	5	0.93	1.00	Yes	No	No	2

Table 23: Selection of responses for five international students without a smart phone

Figure 40 shows that these five respondents are clearly outliers representing the most extreme cases of non-use. From this results it is easy to draw the conclusion that not having a smart phone negatively affects phone use, and the use of the phone to find information. However, responses to questions **5.d**, **5.e** and **5.g** are mixed. Still, as over 70% of respondents answered

‘yes’ to each of these questions, these respondents are in the minority. Results support the assertion that not owning a smart phone can have a negative impact, particularly when it comes to finding information.

In the Phase One study it was observed that technology appropriation and use changed during the course of an international student’s journey. Phase Two asked a number of questions relating to travel experience and time spent staying in Australia and Tasmania, and mobile phone ownership. RQ5 is interested in whether time spent living in Tasmania is associated with mobile phone use. Results in Table 22 support a positive relationship between staying in Tasmania and mobile phone use; they also support a strong relationship between the length of time staying in Tasmania and the length of time owning a mobile phone. This is to be expected if respondents own multiple phones (17% of respondents in this case do) and a new phone is purchased on arrival in Australia, Tasmania. It is likely not the case that an international student arrives to purchase their first phone, but gets another one to keep alongside one from home. It is also likely based on this result that how the phone is used will change and use may increase.

RQ3 was interested in the extent to which an international student relies on their phone. This is a complex question, but some insights may be gained here. Question **5.h** asked respondents to rate the significance of losing their mobile phone, 76.09% rated the significance 4 (36.51%) or 5 (39.58%), indicating that it would have a significant impact on their lives. Correlation between questions **5.h** and **5.b** provides support for the statement that their ability to use the phone (frequency and range of functions used) may be related. Perhaps a better way to phrase RQ3 is to instead ask how an individual values their phone and investigate how important it is for certain behaviours (or practices) in their everyday life.

7.4. Summary

This part of Chapter 7 provides a summary of the chapter. The chapter has been presented in two parts. Part 7.2 has presented the results of analysis, providing descriptive statistics of response data, scale analysis for questions 5.b and 5.c and presented results of bivariate analysis that related to the mobile phone use by international students. Part 7.3 has provided a discussion of the results from analysis, relating them to the study aim and associated research questions.

8. Phase Three research design

8.1. Introduction

This chapter presents the research design for the Phase Three study in four parts. Part two provides background information supporting the Phase One study. Part three presents the methods of data collection employed. Part four presents appropriate data analysis techniques. Part five presents procedures and process followed for conducting the study. Before proceeding, the study received ethical approval from the Tasmania Social Science Human Research Ethics Committee (HREC) at the University of Tasmania [Ethics reference H0013924].

- Part 8.2 presents a background to the study, covering the aims and research questions, paradigmatic assumptions and the profile of participants recruited for the study.
- Part 8.3 presents methods of data collection employed by the study, describing the semi-structured interview technique and Information Source Horizon (ISH) mapping exercise.
- Part 8.4 presents the techniques for data analysis, describing the Interpretative Phenomenological Analysis (IPA) technique and techniques for analysing ISH maps.
- Part 8.5 presents the procedures and process for conduction of the study including the recruitment strategy and interview procedure.

8.2. Background

This part of Chapter 8 describes the design of the Phase Three study in three sections. Section 8.2.1 presents the aims for the study which builds on results from two previous studies, Phase One and Phase Two, to investigate the information seeking of international students. Section 8.2.2 presents the paradigmatic assumptions which underpin the study of international students' information seeking from an everyday information practice perspective. Section 8.2.3 presents the characteristics of international students selected to participate in the study.

8.2.1. Aims

This section presents the aims and Research Questions (RQs) that guided the Phase Three study. Previously a Phase One study established that ICTs used for communication change during an international student's journey and that having a phone was important throughout

this journey and changing circumstances. A Phase Two study further found that phone use by international students is extensive, and that a range of information is sought when using a phone. Building on the previous two studies, the Phase Three study aimed to understand the role of a mobile phone in an international student's Everyday Life Information Seeking (ELIS) as a particular case of ICT in an international student's everyday life.

The study drew on the work of Reijo Savolainen, including their concept of the Information Source Horizon (Savolainen & Kari, 2004) and the theoretical framework of Everyday Information Practice (Savolainen, 2008). The study focuses on the phenomena of information seeking, use and sharing in a socio-cultural context where attention is paid to individual variation and common features that indicate the shared (social and cultural) characteristics of everyday information practices. The following research questions were developed to guide this investigation of international students' ELIS. They have been developed based on the theoretical framework of information practice and related concepts:

- **RQ1:** Which information sources and channels are preferred by international students when seeking orienting information?
- **RQ2:** In what ways are information sources and channels preferred by international students?
- **RQ3:** To what extent and in what ways are mobile phones important to everyday life information seeking practices?
- **RQ4:** In what ways are mobile phones positioned in relation to other sources and channels in an international student's Information Source Horizons?
- **RQ5:** How do international students select and value information sources and channels in their everyday information practices?

8.2.2. Paradigmatic assumptions

This section presents the philosophical assumption which underpins the Phase Three study's research design. The study follows a practice approach to understanding the role of a mobile phone in the everyday life of an international student, which is underpinned by the hermeneutic research paradigm, with a social phenomenological methodology.

To understand the role of a mobile phone in ELIS this study focused on an international student's experience of everyday life while staying in Tasmania and the phenomena of

information seeking through the concept of everyday information practices (Savolainen, 2008). Everyday information practice follows a social phenomenological methodology, and both Tom D. Wilson (2002) and Savolainen (2008) advocate the use of social phenomenology as an integrative framework for information science, particularly the use of phenomenology as a framework for informing the research methods employed to study information practice. Social phenomenology is a sociological variant of phenomenology that:

> *combines philosophical and sociological ideas in order to study the reciprocal interactions among the process of human action, situational structuring, and reality construction in the context of life-world* (T. D. Wilson & Savolainen, 2013, p. 141).

Social phenomenology (Schutz & Luckmann, 1974) is founded on the works of Max Weber and Edmund Husserl, and it provides a methodological bridge between the meaning that social actors attribute to action and the meaning that a researcher must attribute to produce an accurate theory (Blaikie, 2007, p. 128). According to Blaikie (2007, p. 129) the position taken by Schutz in respect to 'verstehen' (understanding) is different in that verstehen is 'subjective' in the sense that it aims to discover what a social actor means by their action, which is in contrast to the meaning that the action has for other social actors in the situation or for an outside observer. Social phenomenology is underpinned by the paradigm of interpretivism, which 'looks for culturally derived and historically situated interpretations of the social life-world' (Crotty, 1998, p. 67).

Following the approach taken by Savolainen (2008, p. 80), individual accounts of everyday life are accessed through the research interview, but where Savolainen applies the technique of qualitative content analysis to interpret these accounts (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005), this study draws on the technique of interpretative phenomenological analysis (IPA) underpinned by the hermeneutic tradition (J. A. Smith, Flowers, & Larkin, 2009). IPA is adopted for this study to bring a phenomenological perspective to the interpretation of information practice and balance the cognitive and constructionist perspectives embedded in the practice approach (Schatzki, 2005b).

The aim of IPA is to firstly understand a person's life world and describe 'what it is like' from their perspective. This description is linked to a particular experience, for instance of an event, process or relationship – the phenomenon in question. Secondly IPA aims to develop

an interpretative analysis, placing the person's experience in a wider social, cultural or theoretical context (Larkin, Watts, & Clifton, 2006, p. 104). IPA makes sense of what this means for a person by understanding what is important to them in this context through an interpretative account to reveal the objects of concern (Larkin et al., 2006, pp. 112–113).

IPA is influenced by the concepts of phenomenology, hermeneutics and an idiographic approach that is concerned with human lived experience. It recognises that a person's world view is critical when attempting to understand social phenomena, but also that this act requires interpretative work on the part of the researcher. It recognises that people perceive the world differently based on their personality, prior life experience and motivations. IPA situates people in their particular contexts, and prioritises the individual case before generalising across them.

IPA focuses on the cognitive and emotional entities in what a person is saying or writing, and attempts to understand what they think or feel about a particular topic at hand. IPA is particularly suited to social-psychological research where a researcher is interested in asking people questions about the meaning of experiences (Smith et al., 2009, p. 231). While influenced by phenomenology, IPA does not privilege one type of phenomenological thought over another, rather it focuses on the core tenet(s) of the approach, that is human lived experience.

> *It can be understood via an examination of the meanings which people impress upon it. These meanings, in turn, may illuminate the embodied, cognitive-affective and existential domains of psychology. People are physical and psychological entities. They do things in the world, they reflect on what they do and those actions have meaningful, existential consequences* (Smith et al., 2009, p. 34).

In recognising that analysis – that an attempt at understanding a person's lives experience requires interpretative work on the part of the researcher –, IPA follows a hermeneutic approach. Hermeneutics literally means the interpretation of texts and historically the paradigm has been aligned to varying degrees with the interpretative or phenomenological paradigms (Crotty, 1998). The strength of alignment depends on the school of thought drawn upon by the researcher when it comes to the question of whether or not objective interpretation of texts is possible (Blaikie, 2007). In hermeneutics, the hermeneutic cycle

describes the process of interpretation, it is a cyclical concept concerned with the relationship between the part of the whole at a series of levels, 'to understand any given part, you must look at the whole; to understand the whole, you must look to the parts'(Smith et al., 2009, p. 28); for instance if the *part* is a single extract and the *whole* a complete text then the meaning of the extract becomes clear when seen in the context of the whole text and the meaning of the complete text depends on the cumulative meanings of the extracts (Smith et al., 2009).

During IPA a researcher's preconceptions are handled through the hermeneutic cycle of the research process (cyclical reflection and bracketing). Following the Double Hermeneutic – a participant's meaning-making is first order and the researcher's sense-making is second. By attempting to understand lived experience IPA is both empathetic and questioning, by trying to 'stand in another's shoes' and then making sense of that experience (Smith et al., 2009).

IPA moves through levels of interpretation, grounded in the meeting of researcher and text which have been produced by the individual person. The approach of idiographic sensibility means that emphasis is placed on detailed, nuanced analysis of particular instances of lived experience. An idiographic approach distinguishing the specifics from 'things in general', for example the study of a specific individual, a situation or event (Larkin et al., 2006, p. 103).

Thus IPA is a technique situated between a phenomenology and an interpretation; it requires that an insider's account be generated faithfully and that meaning and commonality are then sought beyond it (to an extent) by the researcher. Larkin et al., (2006) provide a summary of the key objectives of IPA as follows (p. 117):

1. *IPA's phenomenological component maps out the participants' concerns and cares / their orientation toward the world / in the form of the experiences that they claim for themselves (e.g., 'How has this phenomenon been understood by this person?').*
2. *IPA's interpretative component contextualizes these claims within their cultural and physical environments, and then attempts to make sense of the mutually constitutive relationship between 'person' and 'world' from within a psychological framework (e.g., 'What does this mean for this person, in this context?').*
3. *The overall outcome for the researcher should be a renewed insight into the 'phenomenon at hand' / informed by the participant's own relatedness to, and engagement with, that phenomenon.*

Following Blaikie's approach to classifying philosophical assumptions the abductive research strategy is appropriate for a study underpinned by the hermeneutic paradigm, but rather than an idealist ontology this position is underpinned by a subtle realist ontology to account for the interpretive focus brought by the social phenomenological methodology and the appropriate epistemology here is social constructionism (Blaikie, 2007).

8.2.3. Participants

This section presents the characteristics of participants who were recruited for the study. Participants were international students currently studying a degree course at the University of Tasmania. The study aimed to interview between 15–20 international students staying in Hobart or Launceston. For this study a primarily purposive sampling strategy was adopted, with participants recruited to provide a diverse collection of life experience (Lincoln & Guba, 1985).

The only requirement for participation was that participants needed to own a mobile phone. It was preferred that of the 15–20 participants at least half were male and half female, for gender balance, and that a range of ages and nationalities were represented in the group. A proportion of participants were recruited who were in their first year of study at the University of Tasmania, to contrast the perspectives of recently arrived students against ones whose lives are more well established.

8.3. Data collection

This part of Chapter 8 presents the methods of data collection employed in two sections. Section 8.3.1 presents the semi-structured research interview technique and section 8.3.2 presents the information horizon map think aloud exercise, providing background into these methods and the rationale for their use in this research.

8.3.1. The semi-structured research interview

This section presents the semi-structured research interview technique. The main data collection technique for this study was the one-to-one semi-structured (or open ended) research interview using a pre-prepared interview guide.

The interview technique is an important method of data collection in social research, it attempts to understand the world from an individual's point of view to reveal the meaning of their experiences (Brinkmann & Kvale, 2015). Brinkmann and Kvale define the research

interview as ‘an inter-change of views, where knowledge is constructed in the inter-action between the interviewer and the interviewee’ (2015, p. 4). Put simply, the purpose of an interview is ‘to find out what is in and on someone else’s mind’ (Patton, 1990, p. 279).

Broadly, interviews may either be structured or unstructured. In a structured interview a fixed set of pre-prepared questions are asked by a researcher in a fixed order. An interviewee may be asked to choose a response from a fixed series of response categories or to provide their own response to the question. In an unstructured interview the researcher may treat the interview as ‘conversation’, where questions flow from the immediate context and are not pre-determined (Patton, 1990). In between these two extremes are semi-structured interviews, which balance the structured and unstructured approaches to a degree determined by the researcher and the research requirements at hand. The semi-structured research interview technique allows the research interview to have some structure, while letting the researcher hear about the experiences of an interviewee in their own words, allowing them to enter into their own perspective through a less structured conversational format (Patton, 1990).

A semi-structured interview may be accompanied by an interview guide. An interview guide is a list of questions, issues or topics that are designed to be explored during the course of an interview. A guide is prepared to ensure that the same information is obtained from a number of people by covering the same material in each interview. Having guiding material allows the interviewer to build conversation in a pre-determined area of interest in a spontaneous, conversational style; this informal format also leaves the possibility open for emerging topics or questions to be explored during an interview process (Patton, 1990).

8.3.2. Information Source Horizon (ISH) mapping

This section presents the Information Source Horizon (ISH) technique for mapping an individual’s information source preferences. The ISH technique is a think aloud graphical drawing exercise that allows a researcher to distil the information source and channel preferences for an individual in everyday contexts and situations.

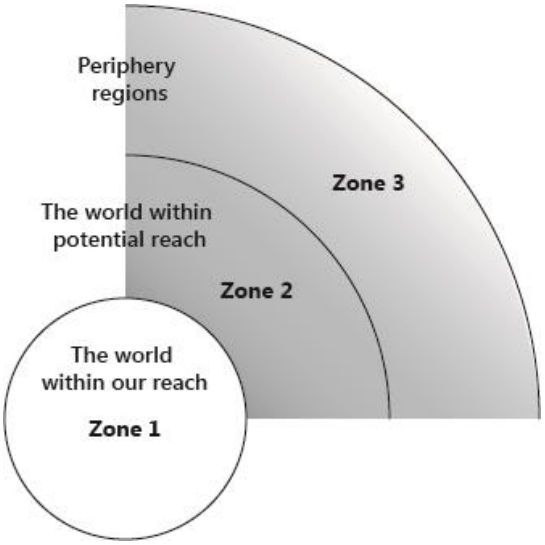


Figure 41: Visual representation of the regions of relevance concept and concentric circles

The idea of an ISH map draws on the concept of 'regions of relevance' and the spatial arrangement of the everyday life world from the social phenomenology of Schutz (Schutz & Luckmann, 1974). Savolainen provides a conceptual framework for understanding the relationship between the spatial arrangement of an individual's life world and the regions of relevance that define zones on the ISH map, illustrated in Figure 41. The exercise procedure followed by Savolainen (2007) is structured using this framework; a participant is asked to plot their ISH regarding orienting information about issues of topics relevant to them as follows:

1. A participant is asked to place them self in the middle of the paper.
2. They then 'place' the information sources and channels typically used to monitor everyday events, so that the most important concepts are closer to them, and less important ones further away.
3. While placing concepts (constructing the map) the participant is asked to specify criteria by which a concept is preferred or not when seeking information. This requires a participant to think aloud the process of placing a concept and explain their decision making, and how they value sources in relation to one another.

The theory indicates that an individual will construct an ISH 'by drawing on diverse source preference criteria, and that the definition of these criteria is affected by the regions of

relevance of everyday issues' or interests (Savolainen, 2007, p. 1712). In this way an individual's ISH map provides a graphical representation of information resources and preferences for them (Savolainen, 2007). Following the framework information sources on an ISH map will be placed into three categories: Zone 1, Zone 2 and Zone 3, referred to as zones of source preference in Figure 41. Zone 1 contains the most important sources, sources of secondary importance are placed further on in Zone 2 and sources of least importance on the horizons boundary Zone 3.

Placement will depend on the individual, and the level of structure with which the exercise is conducted. Initially Savolainen & Kari (2004) provided individuals with a template where zones were pre-drawn, and later on less structure was provided and a blank sheet of paper sufficed (Savolainen, 2007). Savolainen finds that participants perceive the task of plotting concepts on the map fairly easy, but that participants may use more or less than three zones and that sometimes sources are placed on the boundaries of zones. How these issues are resolved when transcribing and interpreting an individual's ISH map is left up to the discretion of the researcher (Savolainen, 2007, 2010).Placement will depend on the individual, and the level of structure with which the exercises is conducted. Initially Savolainen (Savolainen & Kari, 2004) provided individuals with a template where zones were pre-drawn, later on less structure was provided and a blank sheet of paper sufficed (Savolainen, 2007). Savolainen finds that participants perceive the task of plotting concepts on the map fairly easy, but that participants may use more or less than three zones and that sometimes sources are placed on the boundaries of zones. How these issues are resolved when transcribing and interpreting an individual's ISH map is left up to the discretion of the researcher (Savolainen, 2007, 2010).

8.4. Data analysis

This part of Chapter 8 presents techniques for data analysis in two sections. Section 8.4.1 presents Interpretative Phenomenological Analysis (IPA), a technique for analysing the transcripts of interviews with research participants, and section 8.4.2 presents the procedure of analysing ISH maps generated by participants during an interview.

8.4.1. Interpretative Phenomenological Analysis (IPA)

This section presents the IPA data analysis technique. IPA is an approach to qualitative, experiential and psychological research that recognises people perceive the world differently

based on their personality, prior life experience and motivations (Smith et al., 2009). Following the concepts of phenomenology, hermeneutics and an idiographic approach, Smith et al. (2009) describe the IPA analysis procedure for a single case as follows:

- **Step 1:** Analysis starts with the researcher actively engaging a case.
- **Step 2:** Exploratory annotation of a single case transcript.
- **Step 3:** Then a systematic search for emergent themes in a single case.
- **Step 4:** Connections are then forged between themes to establish superordinate themes.
- **Step 5:** This process is repeated for each case, and once completed the researcher can work between cases to establish a set of master themes.
- **Step 6:** Master themes are then translated into a narrative account introducing each topic and its subordinate themes. Themes are described in detail, with the support of verbatim extracts from interview transcripts capturing the participant's voice.

Step 1: Active engagement. The researcher must immerse themselves in the case by reading and re-reading the original data – such as the interview transcript. This process encourages the researcher to slow down, reflect on the interview experience or even record observations about the transcript to 'bracket' them off for a while. The objective of this activity is to achieve active engagement with the data.

Step 2: Exploratory notation. The researcher now examines the semantic content and language, noting anything of interest within the transcript. The process is exploratory and detailed notes or comments can be recorded on the data. The phenomenological work may involve describing the things that matter to a participant and the meaning they ascribe to those things. Interpretative noting which looks at the language and context can help explain how and why these concerns are important to a participant. Identifying other abstract concepts can also help make sense of the meaning a participant ascribes to their concerns. Smith & Osborn (2008) offer some direction by dividing the process of exploratory notion into the generation of descriptive, linguistic and conceptual comments:

- *Descriptive* comments focus on describing the content of what the participant has said, and the subject of conversation within the transcript (context).

- *Linguistic* comments focus upon exploring the specific use of language by the participant.
- *Conceptual* comments focus on engaging at a more interrogative and conceptual level.

Step 3: Developing emergent themes. Once the researcher is satisfied with the exploratory notation, emergent themes can be developed. This process involves mapping interrelationships, connections and patterns between exploratory notes. Themes emerge as concise statements that should capture and reflect an understanding of what was important in the various exploratory notes. As Smith describes it:

> *Themes are usually expressed as phrases which speak to the psychological essence of the piece and contain enough particularity to be grounded and enough abstraction to be conceptual* (Smith et al., 2009, p. 92).

Step 4: Forging connections across themes. The development of individual themes reflects the synergistic process of description and interpretation on the part of a researcher. Once themes for a case have been developed the researcher needs to map the connections among themes, and how they think themes fit together. Smith et al., (2009) offer a range of strategic processes for exploring the connections and patterns among emergent themes (Smith et al., 2009, pp. 96–99).

- **Abstraction:** the development of subordinate themes by pairing like with like to create a cluster.
- **Subsumption:** Where a theme acquires a superordinate status by bring together a series of related (subordinate) themes.
- **Polarization:** Connections are explored in the oppositional relationships (difference) between themes. This polarization can lead to the higher order organisation of themes.
- **Contextualisation:** Connections are established through identifying contextual or narrative elements within exploratory notation. Themes that relate to life events, or narrative moments could be highlighted to organise themes.
- **Numeration:** Exploring the frequency of emergent themes may reveal patterns, and help the researcher judge their relative importance or relevance to the participant.
- **Function:** The specific function of emergent themes within a transcript may be examined. This could involve exploring the interplay among meanings by looking at

the positive or negative presentation of themes within the transcript. The process focuses on use of language, and draws on discourse and narrative analysis.

This process of exploring and forming connections and patterns among emergent themes should be documented by the researcher. Once completed a graphic representation of the emergent structure should be created, annotated with the line/page numbers from where themes were drawn and some key words from the transcript that provide context.

Step 5: Repeat for each case. Steps 1–5 are repeated for each case. Once completed the researcher can work between cases to establish a set of master themes following Step 6.

Step 6: Establishing patterns across cases. In order to establish patterns across cases a researcher looks for master themes. This process can involve exploring the idiosyncratic instances and higher order concepts among cases. Master themes are then translated into a narrative account introducing each topic and its subordinate themes. Themes are described in detail, with the support of verbatim extracts from interview transcripts capturing the participant's voice.

8.4.2. Information Source Horizon (ISH) map analysis

This section presents techniques appropriate for analysing Information Source Horizon (ISH) maps. Since ISH maps are visual representations of an individual's cognitive (reflexive) process of information seeking, methods used to analyse cognitive or content maps may also be used in the analysis of ISH maps. Approaches include concept counting, where the frequency of different concepts on a map is counted for each individual and then compared at a group level. The placement of the concepts within a map and the connections between and among levels of concepts may be described to understand the relationships among concepts. Further, the construction of maps may also be considered, the degree of formality, features used and the placement of concepts (Wheeldon & Faubert, 2009).

Savolainen's approach is as follows. Information sources and channels (concepts) written on an ISH map may be transcribed into three categories or zones of decreasing relevance following the ISH conceptual framework. Zone One contains the most important sources, Zone Two sources of secondary importance further on from Zone One, and Zone Three sources of least importance, which are placed on the ISH map's perimeter beyond zones one and two. In this way terms (sources and channels) are grouped into zones of relevance

according to their distance from the individual (or centre) of the map. Savolainen advises that since zones are not prescriptive the number of zones may vary and it is up to the researcher to interpret and faithfully represent an individual's intentions in these cases (Savolainen, 2010).

These groupings may then be used to inform descriptions of how individuals prefer different sources and channels. For group level analysis, the frequency of terms may be counted and the patterns of preference compared, to understand the difference of similarities in source preference within the group, or between different individual characteristics (i.e. age, gender etc.). Qualitative Content Analysis (QCA) may also be used here for describing and quantifying sources and channels and then classifying them into categories to facilitate theory development (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005).

The process of QCA may be inductive, or deductive. In an inductive approach categories are derived from the data, and in a deductive approach data are grouped into categories determined by previous knowledge (a theory, framework or model etc.). The QCA process is organised into three phases: preparation, organising and reporting. Figure 42 presents a diagram of the QCA process reproduced from that presented by Elo and Kyngäs (2008).

Analysis is a flexible process, and there are no systematic rules for data analysis in the process described by Figure 42. In the preparation phase the researcher's focus is on what to analyse. It will involve determining the unit of analysis such as a word, sentence, theme etc. and this will depend on the research aim and associated research questions.

The researcher then works to make sense of the data as a whole, before beginning the process of organising the data. The organising phase may be guided by an inductive or deductive process as shown in Figure 42, involving a series of steps that may be undertaken in a linear or iterative process. Lastly the analysis process followed and results of analysis are presented. This description may take the form of a model, conceptual system, concept map, categories or another kind of theoretical construct (Elo & Kyngäs, 2008). When analysis is complete the results of ISH map analysis can be used to check the reliability and consistency of interview analysis as well as provide insight into an individual's cognitive process and characteristics of the group (Savolainen, 2008; Sonnenwald et al., 2001).

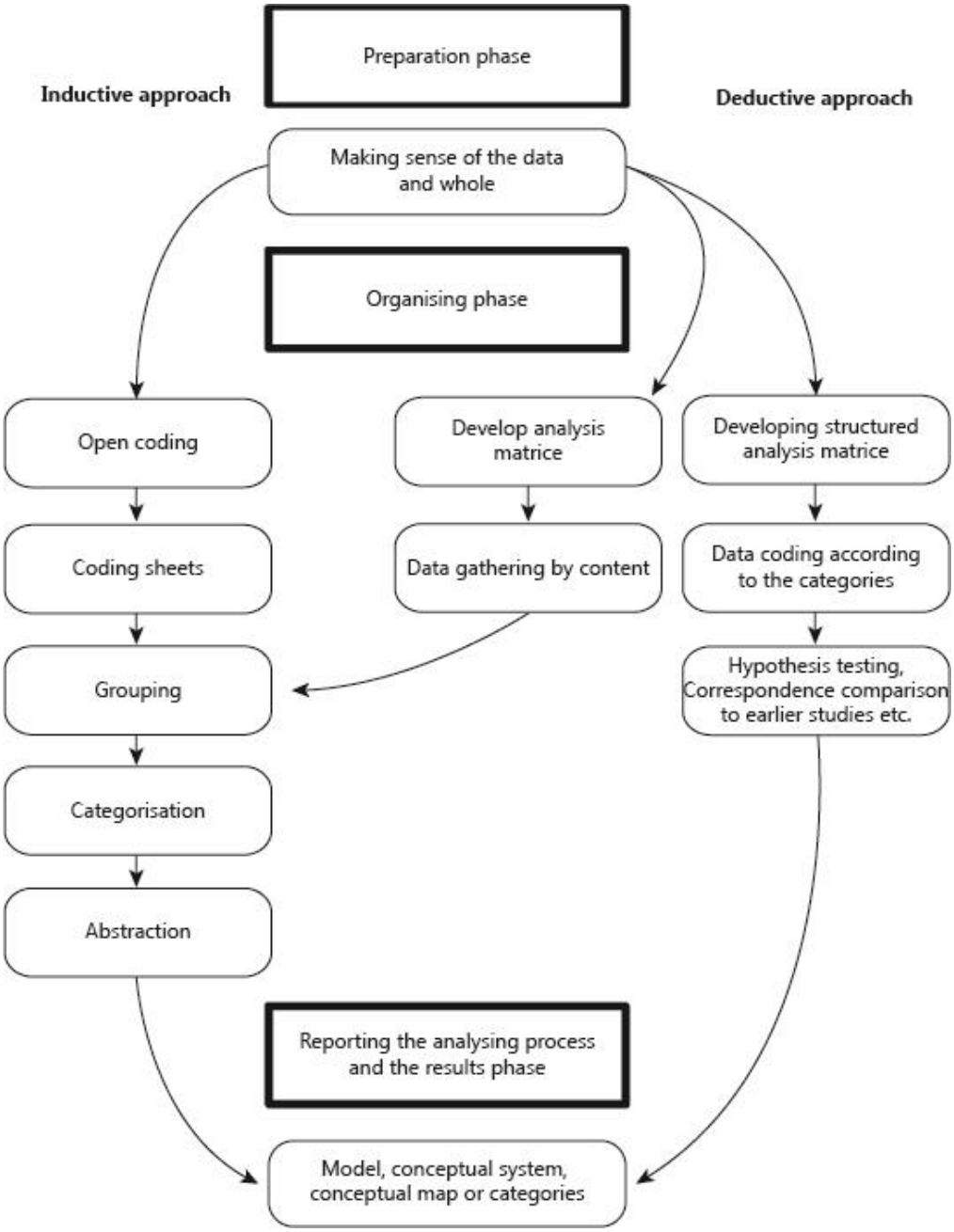


Figure 42: Diagram of the QCA process (Elo & Kyngäs, 2008, p. 110).

8.5. Study procedures and processes

This part of Chapter 8 presents the study procedures and processes in two sections. Section 8.5.1 presents the recruitment strategy followed and section 8.5.2 presents the interview procedures adopted for the semi-structured interviews.

8.5.1. Recruitment strategy

This section presents the recruitment strategy. The study was advertised to international students who participated in the Phase Two Study, then a wider recruitment strategy was employed as follows:

- By working with the University of Tasmania (UTAS), specifically through the support of staff at the English Language Centre, Community Friends and Networks program and the Student Centre to advertise the study;
- Working with the Tasmania University Union (TUU) and their club and society presidents to advertise the study;
- A stall was setup outside the Morris Miller library on the UTAS Sandy Bay campus. The researcher engaged international students who passed by, asking them if they would like to be a participant. If they agreed, a name, email address and phone number were recorded to send information and follow-up with a formal invitation.

Recruitment was anticipated to take place in March–April 2014; a webpage was established to advertise the study, provide information and communicate the research project being undertaken. All advertisements directed potential participants to the website for more information and the opportunity to participate. A Participant Information Sheet and Consent Form were available on that page to participants, developed using templates provided by the Tasmania Social Science Human Research Ethics Committee (HREC).

Potential participants were asked to complete a short registration form, which asked a series of demographic and situational questions about their stay in Tasmania. This questionnaire was based on a previous questionnaire developed for the Phase Two study. The form was accessible through the research website. Information collected by this questionnaire was kept and used with the participant's permission, which was sought if they chose to participate in the study, through the Consent Form.

8.5.2. Interview procedure

This section presents the interview procedures adopted for semi-structured interviews. Interviews took place in room 154 of the Mathematics building at the UTAS Sandy Bay Campus. Interviews lasted between 30 minutes to 1 hour and were recorded with permission from each participant for later transcription and analysis. Participants were provided with refreshments as an incentive for participating. An interview was conducted in three parts as detailed in the interview guide in Appendix 13.1:

- **[Part 1: Introduction]** Introduction to the research and an informal conversation about the participant's experience of staying in Tasmania, with a focus on their current circumstances and the journey so far.
- **[Part 2: Information Source Horizon mapping]** A think aloud graphical drawing exercise where participants map their Information Source Horizons (ISH).
- **[Part 3: Reflection]** Reflection on the nature of habits, and their change once the ISH map is created.

Part 1: Introduction

Each interview began with a participant being provided with a copy of the information sheet and the consent form. The interviewer gave an introduction to the research project and answered any questions the participant had while they completed this initial paper work. The interviewer then asked if the participant was comfortable to proceed with the interview and confirmed that they had comprehended the information provided.

The introduction started with an informal conversation about a participant's experience of staying in Tasmania. This conversation led into specific questioning where a participant was then asked to describe topics of interest (issues, interests or hobbies) that they were regularly monitoring during their daily lives while staying in Tasmania. Each participant was asked why these topics were significant to them. A series of 3–10 topics were generated in this conversation.

An interview guide was provided, which listed a range of topics relating to international student adjustment issues (see Appendix 13.1 Interview Guide). This guide was followed by the researcher to prompt conversation and probe the participants' experience. Answers from the pre-interview questionnaire were also used to facilitate discussion with the participant during the informal discussion (Patton, 1990). This informal approach helped settle the

participant into a casual conversation with the interviewer and reveal relevant issues and interests that would facilitate the 'think aloud' ISH mapping exercise.

Part 2: Information Source Horizon (ISH) mapping

The second part of the semi-structured interview involved the graphical drawing 'think aloud' exercise to map the participants' Information Source Horizons (ISH). The exercise was designed to facilitate a detailed conversation about a participant's information source selection and preference when seeking information about issues and interests raised by a participant. The ISH exercise started with an informant being give an A4 piece of paper and a selection of coloured pens.

The participant was asked to reflect on their orientation information seeking in relation to the topics generated in the previous conversation and to think of which information sources they would normally select to use when seeking out this information. A participant was first asked to think about themselves as a source of information (and their stock of knowledge), and then to place themselves on the A4 page, then to list each other information source in the order they came to mind. A participant was instructed that the further away from themselves these sources were placed, the less relevant they were perceived to be. For illustrative purposes an extract from a completed interview, following this process, is presented:

Researcher: *'The way to imagine it is if you close your eyes and then think about say cricket, and then you think well where would I go to find the best information on cricket or the information I needed, then something would pop in to your mind'.*

Participant 10: *'Yes definitely'.*

Researcher: *'And then if you thought a little harder you might think of another thing and then another thing. And so the most important things are usually closest to you and the least important things are usually further away. It is a little bit of drawing and a little bit of talking. On this piece of paper, you put yourself, write your name or a little diagram of yourself and then we go through each of the things you think of, the sources, and we put them on here. You put them closer to yourself if they are more important or further away if they are less*

important. You can use this pen. And then we talk about them and you tell me why you put them there and I will ask you some questions about why one is more important than another and things like that. And then I get a bit of a picture of your information source horizon. Does that make sense?

During this process the participant was asked to speak out aloud their process of choosing where a source is placed (why did you place it there?), to reflect on why a source was preferred over other sources already listed (or not) and how they decided where to place it (what criteria were important in the positioning of the source?). For each source that came to mind the participant was also asked to describe any important details, for instance a participant's relationship with another person or the type and model of a mobile phone. This process was repeated until an exhaustive list of sources had been defined. On completion of this exercise as single ISH map was generated by the participant.

Part 3: Reflection

Once the ISH map was completed participants were given an opportunity to reflect on the exercise, and in this process they were asked to specifically reflect on three aspects:

- the completed ISH map and whether it accurately reflected their perceived information environment;
- their habits of seeking orienting information and whether they perceive them to have changed since coming to stay in Tasmania;
- the topics of interest (projects) and whether they perceive them as general or specific (Hektor, 2001).

The ISH map provided a summary of the discussion, and by asking participants to validate its accuracy an ISH map enabled a conversation to take place about the credibility of the interview and whether the participants experience had been accurately recorded. To further enable the validation of results by participants, transcripts and ISH maps were provided for checking and feedback as part of the study procedure.

8.6. Summary

This part of Chapter 8 presents a summary of the chapter. This chapter has been presented in four parts. Part 8.2 provided a background to the study, presenting the aims and research questions, paradigmatic assumptions and a profile of the participants for the study. Part 8.3 presented a description of the methods of data collection, which included the semi-structured interview technique and Information Source Horizon (ISH) mapping exercise. Part 8.4 presented techniques for data analysis, which included Interpretative Phenomenological Analysis (IPA) and techniques for analysing ISH maps. Part 8.5 presented the study procedures and processes, providing a description of the recruitment strategy and interview procedure.

9. Phase Three results and discussion

9.1. Introduction

This chapter presents the results and discussion for the Phase Three study in four parts. Part two presents the results of participant recruitment. Part three presents the results of Information Source Horizon (ISH) map data analysis. Part four presents the results of Interpretative Phenomenological Analysis (IPA) of interviews data and part five presents a discussion of the study's results.

- Part 9.2 presents the results of participant recruitment for the study.
- Part 9.3 presents results from the analysis of Information Source Horizon maps.
- Part 9.4 presents results from the Interpretative Phenomenological Analysis (IPA) of interview transcripts.
- Part 9.5 presents a discussion of results in relation to the aim and research questions which guided the study.

9.2. Results of participant recruitment

This part of Chapter 9 presents the results of recruitment of participants for the Phase Three study. After a prolonged search fifteen international students were recruited to the study for interview. Each participant completed a screening questionnaire before participating, and the results of this questionnaire are displayed in Table 24. Each participant has been given an ID here to remove use of their name and de-identify them to an extent. All participants completed a consent form prior to participating is the study, asking permission that audio recordings be made and the use of transcripts for analysis and presentation as results. An exception was made for participant 9 who said that they had no mobile phone at the time of participation in the study.

#	Age	Gender	Country	Degree Course	Year of study	Family in Australia	Type of phone
15	N/A	Male	China	Postgraduate (Course work)	Second year	No	Android Phone
8	30	Female	Germany	Exchange	First year	Yes	Android Phone
6	28	Female	Nepal	Postgraduate (Research)	Third year	No	iPhone
1	27	Male	Lebanon/Ukraine	Postgraduate (Research)	Third year	Yes	iPhone

#	Age	Gender	Country	Degree Course	Year of study	Family in Australia	Type of phone
7	27	Female	Indonesia	Postgraduate (Research)	First year	No	iPhone
14	27	Male	Maldives	Bachelors Degree	First year	No	Android Phone
3	26	Male	Singapore	Postgraduate (Research)	Fifth year or more	Yes	iPhone
13	26	Female	Kazakhstan	Postgraduate (Research)	First year	No	Android Phone
4	25	Female	UK	Postgraduate (Research)	Third year	Yes	iPhone
2	25	Male	Pakistan	Postgraduate (Course work)	Second year	Yes	Android Phone
5	25	Male	India	Postgraduate (Course work)	Second year	No	Android Phone
9	19	Female	Japan	Diploma	First year	No	No phone
10	19	Male	India	Bachelors Degree	First year	No	Android Phone
11	18	Female	China	Bachelors Degree	First year	No	iPhone
12	18	Male	Indonesia	Bachelors Degree	First year	Yes	iPhone

Table 24: Participants recruited for interview

9.3. Results of Information Source Horizon (ISH) map analysis

This part of Chapter 9 presents results from the analysis of Information Source Horizon (ISH) maps. The think aloud drawing exercise generated fifteen unique visual representations of participants' ISHs, presented in Figure 52 to Figure 66. ISH maps were analysed using Qualitative Content Analysis (QCA) (Elo & Kyngäs, 2008) and procedures specific to cognitive and concept maps (Eppler, 2006; Wheeldon & Faubert, 2009). An example map is provided here in Figure 43.

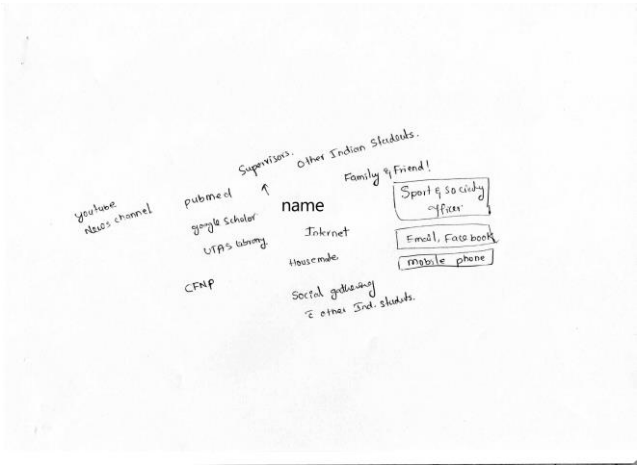


Figure 43: Example ISH map from participant 5

The flexible and individual approach taken towards the ISH mapping procedures during an interview meant that there is significant variation between ISH maps. Maps are inscribed with information sources and channels along with other concepts such as the interests at hand and other contextual information. From a phenomenological perspective these concepts may be regarded as objects of concern that are important to a participant's definition of the information seeking experience (Larkin et al., 2006, p. 111). Here maps have been treated as describing and explaining an individual's ISH, but it is worth contemplating how an ISH map is more than a representation. Maps are emergent, created to solve a relational problem and their construction here is affected by the individual's knowledge, experience and their skills when it comes to making a map. It is important to consider not only what the map is, but how it emerged (Kitchin & Dodge, 2007).

In this way an ISH map may be treated as a kind of cognitive map and by treating the map as a cognitive map, certain kinds of analysis become available. According to Langfield-Smith and Wirth (1992) to compare a person's cognitive maps three types of differences can be identified:

1. The presence or absence of features on the map, i.e. the use of symbols, lines, or distance for constructing an ISH map.
2. The presence or absence of concepts on the map, i.e. interests (context) and/or sources and channels, or different sources such as having or not having a Facebook account.
3. The strength of concepts on the map (in this case their perceived relevance), i.e. is Facebook placed in Zone One or Zone Three?

Preceding this analysis, concepts were transcribed into categories of Zone 1, 2 and 3. This was not a straightforward procedure due to the diversity of map designs. While some maps could clearly be divided into zones based on the concentric circles method used by Savolainen and Kari (2004), others required more complex interpretation where participants had grouped, ordered or organised terms hierarchically under headings. Rather than bluntly fitting that data to the concentric circle device, effort was made to transcribe map concepts in a sensitive manner, preserving the participant's intent. For instance, Participant 1 firstly wrote down four key concepts, circled them and then added subsequent related concepts, arrows etc. The circled concepts are regarded here as Zone 1, and concepts grouped with those as

Zone 2. Interview transcripts were also referred to during transcription of maps for reference to participants' descriptions of map construction.

Following transcription analysis, there was a focus on the absence or presence of graphical features on the maps. Table 25 presents a comparison of the features identified on ISH maps. Following a Qualitative Content Analysis (QCA) approach described by Elo and Kyngas (2008) fifteen feature categories were developed to code observed graphical features for each map. Features were divided into how the concepts were organised (Hierarchy, Spiral, Distance, Groupings, Ordered) and how they were presented (Lines, Shapes, Arrows, Network, Symbols, Emphasis), and other features (Self at centre, Name on map, Non-source concepts, Phone placed). These features may be used to compare individual maps or the group as a whole.

There are important similarities in that all participants placed themselves at the centre of their maps and most used distance to distribute concepts and shapes to organise the space. Arrows were common as were some kinds of emphasis on concepts, and the use of symbols. Most participants placed their mobile phone on the map, but not all did this. There was a lot of variation and it can be said that the maps were highly personalised. This reflected diverse interpretations of the horizon concept and mental images of the information seeking process and relation among related concepts.

Feature / Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hierarchy				Y		Y	Y						Y		
Spiral										Y					
Distance		Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y
Groupings	Y		Y	Y		Y	Y						Y		Y
Ordered						Y									
Lines	Y		Y	Y						Y			Y	Y	
Shapes	Y	Y	Y		Y	Y	Y	Y	Y		Y		Y	Y	
Arrows / direction	Y		Y	Y		Y	Y		Y	Y				Y	
Network	Y		Y										Y	Y	

Feature / Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Symbols	Y		Y			Y	Y				Y		Y		Y
Emphasis		Y	Y		Y	Y	Y				Y			Y	
Self at center	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Name on map		Y			Y	Y		Y		Y		Y	Y		
Non-source concepts	Y		Y	Y		Y	Y						Y		
Phone placed		Y		Y	Y	Y	Y	Y	Y	Y		Y		Y	Y

Table 25: Matrix of ISH map features for each participant, Y = Yes, indicates the presence of a feature.

To further compare ISH maps using the presence or absence of concepts and their strength concepts on ISH maps, the raw data needed to be organised for a meaningful analysis. A total of 181 concepts were inscribed with 153 unique concepts identified across the fifteen ISH maps. Again, following the QCA approach concepts were transcribed into three frequency tables (one for each zone of relevance), which counted the number of times a concept was mentioned by a participant on their ISH map. If the description of two concepts and their meaning (to a participant) were clearly similar they were grouped together (i.e. FB page and Facebook page) to form a list of unique concepts for this exercise.

Next, an analysis of concepts followed a deductive approach, to test whether the concept categories previously established by Savolainen were appropriate for organising this data. It must be noted that the structured approach to ISH mapping followed by Savolainen and Kari (2004) did not generate the same variety of concepts, and for consistency concepts which are not determined to be information sources or channels by the researcher are categorised as ‘Other’ types. To support the deductive QCA analysis a categorization matrix was created to code concepts from ISH maps into the existing categories (Elo & Kyngäs, 2008). The matrix was constructed using types previously identified by Savolainen in a study of environmental activists (2008, p. 97). Types include six broad categories of information sources and channels that are listed as follows:

- Human Sources (i.e. spouse, friends, and acquaintances)
- Broadcast media (i.e. radio and television)
- Printed media (i.e. newspapers, magazines, newsletters, etc.)

- Networked sources (i.e. email, mailing lists, World Wide Web)
- Organisational Sources (i.e. public libraries or associations)
- Other Sources (i.e. course or daily living environment)

Using the categorization matrix, concepts were coded following a strict coding approach and results of this coding procedure for the 181 ISH map concepts across the three zones of relevance is presented in Table 26.

Source type category	Zone 1 % (n = 58)	Zone 2 % (n = 98)	Zone 3 % (n = 24)	% of total concepts
Networked	43.10	23.47	41.67	32.22
Other	17.24	35.71	8.33	26.11
Human	18.97	13.27	20.83	16.11
Organisational	13.79	10.20	12.50	11.67
Broadcast media	3.45	9.18	8.33	7.22
Printed media	3.45	8.16	8.33	6.67
Total	100	100	100	

Table 26: Deductive coding of ISH map concepts using original categories

Categories previously established by Savolainen (2008) can mostly accommodate concepts inscribed on the ISH maps presented here, however it leads to a significant number of concepts being placed in the 'Other' category, which may not be sources or channels. Other discrepancies also emerge during the strict coding and these are framed as a series of questions probing the usefulness of existing categories: Are Facebook, TripAdvisor or Google Maps Networked sources? Are Blogs or E-newsletters Broadcast or Printed media sources, and how would a Meme or a Prayer Room be classified? To address these issues, the list of categories was expanded and definitions adjusted to better fit the ISH map data.

- **Print and digital media:** The original definition included newspapers, magazines and newsletters, but this excludes e-newsletters, e-zines, blogs, memes and many other forms of media. Digital and print media could be separated but many kinds of print media like a newspaper are also published in a digital form so it makes sense to combine the categories.

- **Broadcast media:** The original definition included radio and television, to clarify this definition here is referring to analogue broadcast media.
- **Social media:** This is a new category, the importance of social media as an information source particularly for international students is well recognised but perhaps not well understood (K.-S. Kim & Sin, 2011). This category captured Facebook, Twitter, Instagram and other social media services.
- **Networked:** The original definition of networked sources includes email, mailing lists or the World-Wide-Web. This category was expanded to include sources like Mobile Applications, and Internet Services and Social Networks. Examples would include TripAdvisor, Google Maps, Siri, video and music streaming services or Linked-In. The mobile phone was also placed in this category. Mobile phones did not feature in the results presented by Savolainen (2008) when describing the original categories, they have been placed as a Networked source here to be situated with the Internet and other related source.
- **Organisation:** The original definition includes public libraries and associations; it is probably the right place to also include community and informal organisations. Online discussion groups on platforms like Facebook were inscribed on ISH maps, and these could be networked sources, or social media, but here they are categorised as organisations in the sense that they are a formal organisation of people.
- **Other:** This category remains unchanged and includes any sources not already mentioned, for instance information grounds (i.e. information environments), courses, classes etc. (this would include a prayer room).
- **Context and communication:** These are two new categories; they catch contextual concepts and concepts related to communication that were written down by participants. These are included for the purpose of organising data from the ISH maps.

Following the development of these new categories, the data was sorted once again into the new categories. Results are listed in Table 27. There is some movement in the category proportions, notably the ‘Other’ category now has less concepts and ‘Print and digital media’ now has more than ‘Broadcast media’, notably the portion of concepts in ‘Social media’ is low. Another table, (Table 28) was created where non-information concepts were removed. The table shows proportions for the remaining seven categories; removing the non-

information related categories has no influence on the order of information source/channel categories.

Concept category	Zone 1 % (n = 58)	Zone 2 % (n = 98)	Zone 3 % (n = 24)	% of total concepts
Networked	39.66	20.41	12.50	26.67
Human	20.69	13.27	20.83	16.67
Context	10.34	18.37	4.17	13.89
Organisation	10.34	12.24	12.50	11.67
Other	8.62	13.27	4.17	10.56
Print and digital media	3.45	9.18	20.83	8.89
Broadcast media	1.72	8.16	8.33	6.11
Social media	3.45	2.04	16.67	3.33
Communication	1.72	3.06	0.00	2.22
Total %	100	100	100	100

Table 27: New categories and distribution of coded ISH map concepts (by proportion)

Source type category	Zone 1 % (n = 51)	Zone 2 % (n = 77)	Zone 3 % (n = 23)	% of total concepts
Networked	45.10	25.97	13.04	26.67
Human	23.53	16.88	21.74	16.67
Organisation	11.76	15.58	13.04	11.67
Other	9.80	16.88	4.35	10.56
Print and digital media	3.92	11.69	21.74	8.89
Broadcast media	1.96	10.39	8.70	6.11
Social media	3.92	2.60	17.39	3.33
Total %	100	100	100	100

Table 28: Coding of ISH map concepts to information source and channel concept categories

Source type category	Zone 1 % (n = 51)	Zone 2 % (n = 77)	Zone 3 % (n = 23)
Networked	50%	43%	7%
Human	40%	43%	17%
Organisation	29%	57%	14%
Other	26%	68%	5%
Print and digital media	13%	56%	31%
Broadcast media	9%	73%	18%
Social media	25%	25%	50%
% of total concepts	34%	51%	15%

Table 29: Proportion of concepts across the three zones of relevance, and the proportion of total concepts represented by each zone

So far, this analysis has provided insight into the presence or absence of concepts across the maps. The last step is to compare the strength of concepts on a map by comparing their distribution across zones of relevance for individual participants. Figure 44 presents a comparison of the proportion of concepts in each zone, for each participant. It allows comparison of the strength of zones and the difference between participants. It needs to be noted that the graph represents a comparison on the relative proportions of concepts in each zone for a participant: i.e. for Participant 1, 44% of concepts were placed in Zone 1, while 56% were placed in Zone 2 and none in Zone 3; for Participant 2, 80% were in Zone 1, 20% in Zone 2 and 0 in Zone 3. The number of concepts will vary between participants.

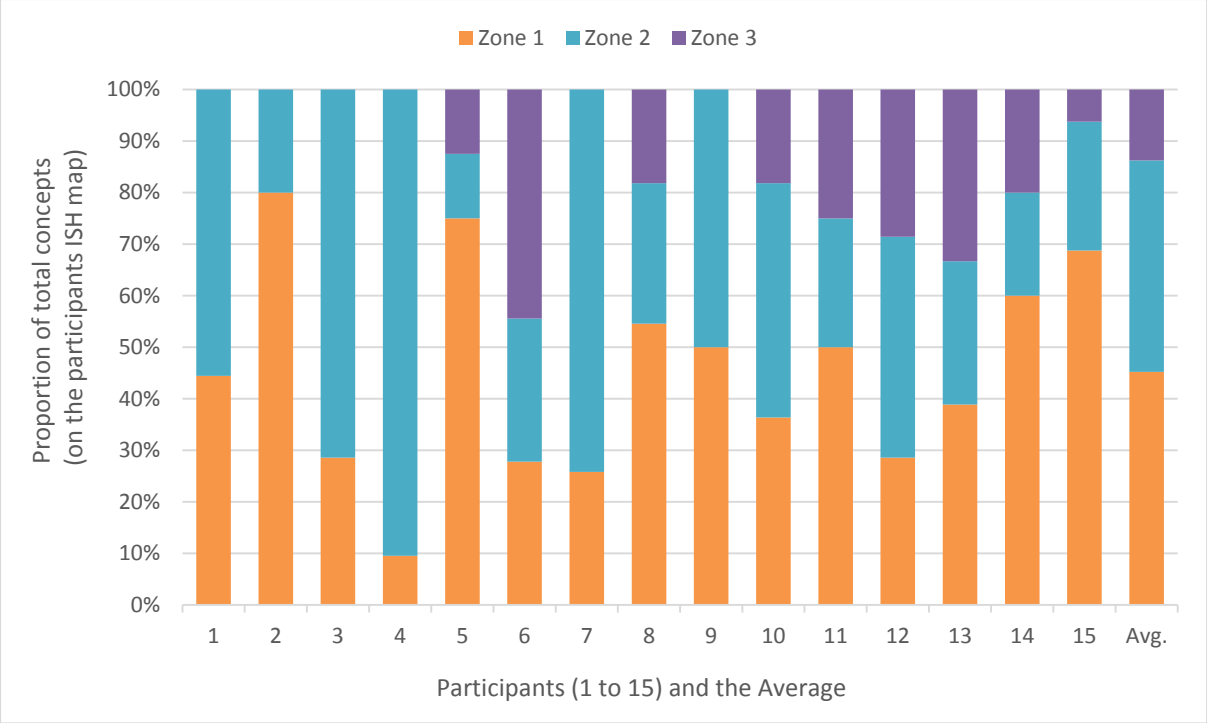


Figure 44: Bar graph comparing the proportion of concepts in each zone for all participants (1–15) and the average proportion of the group.

This analysis can be checked against the ISH maps provided in Information Source Horizon maps in Figure 52 to Figure 66. These are provided for the sake of transparency, transcription of ISH maps required judgments on behalf of the researcher which a reader may wish to interrogate.

9.4. Results of Interpretative Phenomenological Analysis (IPA)

This part of Chapter 9 presents the results from Interpretative Phenomenological Analysis (IPA) of interview transcripts. IPA analysis was performed on the interview transcripts from fifteen (15) interviews with recruited international students (participants). Thematic analysis produced some 1300+ unique themes, which were grouped into 241 super themes. These were then sorted into 20 groups with the assistance of an international student from outside the study who provided an outsider's perspective to the sort.

The international student helped to facilitate a discussion during the sort where the researcher would explain their thinking while organising themes, and discuss the possible interpretations for how themes were grouped. Discussion aimed to find agreement between the researcher and international student so that the explanation for each grouping was clear and made sense to both. The international student was also able to make their own suggestions, creating a discursive process.

Sorting occurred independently from counting the frequency of themes. Once the groups were determined, the frequency of super themes were counted for each thematic group and each participant to create the final groupings, which refer to the most frequent super themes in each group. The resulting groups of super themes are referred to as Master themes, listed in Table 30.

In most cases themes are multifaceted, for instance a theme under the group Information seeking may be related to other groupings such as Experience and vice versa. Themes also may be multilevel as interviews focused on information practice within everyday life experience and participants drew on their individual experiences and life situations, both past and present, during the interviews. In these broadest of groupings, themes transcend both individual and situational factors involved in the experience and everyday information practices. There were also moments of reflection by the researcher and participants during the interviews; these were captured for evaluation of the techniques applied, and for reflexive practice.

Master themes			
Mobile phone	Goals	Personality	Accommodation
Interests	Valuing sources	Culture	Identity
Information seeking	Social interaction	Staying in touch	Learning
Experience	Everyday life	Time	Travel
Arrival	Change	Finances	University life

Table 30: Master themes – groupings of super themes

It is important to note that the frequency of themes is not the frequency that a particular topic or term was mentioned in an interview. Themes were generated following the IPA analytical process described by Smith et al. (2009). For example, the topic of 'Facebook' may be included under numerous other themes, for instance 'Information source' or 'Mobile phone' depending on the topic's relationship to that theme. The theme 'Facebook' may have emerged only rarely or not at all throughout the analysis and as such the two are not related. Due to the quantity of data generated between the fifteen interviews this chapter will provide a broad cross case description of the themes emerging from the IPA analysis, organised into the twenty thematic groupings referred to as Master themes, which are presented in Table 30. The following sections shall provide a description of each Master theme, grounded in an insider's perspective by drawing on the accounts of participants. These descriptions provide an overview of the fifteen individual cases, and a glimpse of what the phone means to an international student's everyday life experience and information seeking practice.

9.4.1. The mobile phone

This section presents the Master theme of 'the Mobile Phone' and associated super themes. Table 31 lists these super themes and indicates in which participants' interviews they arose. An important point to make here is that the mobile phone was a significant focus of interview conversations, but much of the time their interests or other concepts were associated with the phone. This means that during coding the mobile phone emerged as an important channel of information and topic of conversation. Super themes and associated participants are listed in Table 31; some of the most direct and insightful accounts are presented here, others are found in the following nineteen sections describing the other Master themes.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Access	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Communication	N	Y	Y	Y	N	N	N	N	N	Y	Y	N	Y	Y	Y
Computer	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	Y
Email	N	Y	N	Y	N	Y	N	Y	Y	N	N	N	N	N	N
Facebook	Y	N	Y	N	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y
Google	Y	N	N	Y	N	N	Y	N	N	N	N	N	Y	Y	Y
Internet	N	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Landline	N	Y	Y	N	N	Y	N	N	N	N	N	Y	N	N	N
Laptop	N	Y	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Letters	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Newspaper	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
Phone	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Phone use	N	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
QQ	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Searching online	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Technology	Y	Y	N	Y	Y	N	Y	N	N	N	Y	N	N	N	Y
TV	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	Y
YouTube	N	N	N	N	Y	N	N	N	N	N	N	N	N	Y	N
Viber	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
Websites	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N
Wechat	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N

Table 31: Super themes grouped under the Master theme – 'Mobile Phone', where N = no, and Y = Yes.

This thematic grouping reflects the strong associations between multiple forms of communication and technology with the mobile phone – an extract from the account of Participant 13 frames this relationship:

Researcher: *"Ok, so let's have a quick chat about your mobile phone. In your picture, how important is your phone to this whole information horizon?".*

Participant 13: *"You see Facebook is on my mobile phone because I try not to use the laptop for these otherwise I would end up on Facebook for a long time so it is sort of taboo for me to open it on my laptop. Because it is smaller, it is less convenient and you spend less time on it. So this is on mobile. Google calendar is also on my mobile because I mentioned to you that it has a separate screen for this. Google search is more convenient on a mobile rather than a laptop for the quick search and usually if I need something, that would be something quick. Mobile apps are obviously on mobile. So all of these it happens on my mobile phone except for some communication with the University, but with some of them I do communicate frequently via email but from my mobile. So yeah I think most of my communications happen on my mobile phone".*

The phone occupies a complex space, it mediates many sources and channels of information and it is embedded in an individual's everyday activities, not only information seeking. An extract from the account of Participant 1 highlights this mediation:

Participant 1: *'Well my phone fits in to all this picture, in every piece of it. I mean apart from using it for work or to send and receive emails from students or the supervisor, I use the mobile phone to go out with friends, to get in touch, find a location. Sometimes I use it for attending events. So that is where I use the mobile phone. For camping and for bushwalking as well you know you use it sometimes as a navigator so yeah that is where it fits. Regarding the Post Grad Council we do heaps of advertisements on our webpage and we always need to get in touch with each other. We sometimes have discussion pages on Facebook. Sometimes we have discussion emails so of course I check all that using my mobile. And then you have got movies, auroras, holidays, I use my mobile to check all that. I use my mobile heavily to access the internet. I use it also for photography. Apart from work I use my mobile sometimes at work for doing some shots for the experiments'.*

The mobile phone travels with an individual, so participants arrived with a phone and pre-established habits or practices when it came to seeking information and other phone related activities. An extract from the account of Participant 2, as they construct their information source horizon, illustrates the change in phone use between Pakistan – their home country – and Tasmania. It also emphasises a point many participants brought up, that the phone completely affects their everyday life.

Researcher: '*So you would say that map accurately reflects your information horizon?'*

Participant 2: *'Yes it does. I have put myself in the circle and everything is surrounding myself, as in all the different points of contact. I have put the phone in the red square which overlaps the circle because it is very important and without this it completely affects everything in my life. Mostly because of my mobile contacts'.*

Researcher: *'And was this similar when you were back in Pakistan? Were you using your phone as much or has that changed since you have been here'?*

Participant 2: *'In Pakistan...'.*

Researcher: *'Is that something that because you are here in Tasmania, or just because your life has become more busy'?*

Participant 2: *'In Pakistan I used to make a lot of phone calls and texts so I needed my phone for the contacts, but in Pakistan there were many important contacts that I remembered of my friends. I don't know how I used to remember that. Firstly, over here I don't remember any of the contacts and there is so many that I am saving so it is not possible for me to remember. I was dependent even in Pakistan for the phone, but we had alternatives as well. I mean getting a new phone wouldn't be a problem for me because it wouldn't as expensive as it is over here. Secondly, in Pakistan with the internet I would use it on the laptop only. I didn't use my phone for the internet because I had internet at home. You would have a landline phone at home as well in Pakistan so I could make phone calls from that as well. I used to have my alarms on my mobile phone. But I used to have the substitute of having the clock, the alarm clock. I had a substitute for that but over here I don't have that so I use my phone. Thirdly, over there I used to also put reminders on my phone. The only thing that I would say that has changed over here is that the lack of substitutes. In Pakistan I used to have the alarm, if this phone became faulty it wouldn't be hard for me to get a new phone, as it wouldn't be that expensive or I might even have another back up phone, or would borrow one from a friend. Over here I had to loan it from Optus. I didn't use to use internet on my phone'.*

For Participant 3 the phone covered everything, and when asked about how losing their phone would affect their life factors like experience became important when thinking about the value of the phone. When probed about whether the phone could be thought of as an information source it was clear that it was not a source and that it was the utility of the device that made it so important.

Researcher: *'And would you feel if you were to lose your phone? Do you think it is an important part of your daily life'?*

Participant 3: *'Well I don't have my phone with me right now because it is charging. I would say previously 3-4 years ago if I didn't have my phone I would feel really lost and now I think just with age, it is one of those things, I think I will just manage. You don't feel the need, oh I don't have my phone and I don't have access to information, but it is not like I am going to die without this information. But obviously there is threshold point, like if I lose it for more than a day then it becomes in issue. If it is just 6 hours with no mobile I am fine. It is definitely crucial. If I had to sacrifice my mobile phone, these are the things that I can still do, like this part'.*

[…]

Researcher: *'And so if you were to think of a mobile phone as a source of information, how would you value it among all the other things, let's say its importance to you as a source. I asked you whether you could cope without it, but thinking more specifically about just staying up to date'.*

Participant 3: *'I think it is not the device per se. If there was another device that could serve that function, for example the laptop then the mobile phone is not actually that critical in terms of information. But staying in contact with people it probably is but in terms of an information source, not that critical. Like I said I don't have an iPad, so if I had an iPad maybe it would be a bit different, maybe I would rely more on an iPad for that stuff as opposed to the phone. But the laptop is not the best thing to be lugging around. I like to use my laptop for work. I have usually got a few other applications switched on and the last thing I want it to do is freeze. I don't think the mobile, the device itself, is that important if I had an alternative. Right now it is just a device that I am using and things might change if I get an iPad tomorrow and if I am really comfortable with it and it is really convenient, it might change'.*

9.4.2. Interests

This section presents the Master theme of 'Interests', which groups super themes that relate to the interests raised by participants as important focuses during the course of their everyday lives. Table 32 lists the super themes and whether the theme is relevant to a participant's account. Participants had many diverse interests which occupied their minds. They had hobbies, swimming, movies, food, photography, cooking etc. many of which are coded under the super theme of interests.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Interests	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hobbies	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	Y
Keeping Interests	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
Order of things	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	Y
Swimming	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N
News	N	N	Y	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Shopping	N	N	N	N	N	N	Y	N	Y	N	Y	N	N	Y	N
Priorities	N	N	N	Y	Y	N	N	N	N	Y	N	N	Y	N	Y
Development	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N
Being involved	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Not being interested	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Following interests	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
Changing interest	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Movies	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Food	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y
Photography	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
Cooking	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y
Priority	N	N	N	N	N	N	Y	N	N	Y	Y	N	N	N	Y
Sharing interests	N	N	N	Y	N	N	N	Y	N	N	Y	N	N	N	N

Table 32: Super themes grouped under the Master theme 'Interests', where N = no, and Y = Yes.

Many interests had strong social and cultural orientations, they were not solitary activities and usually served some purpose such as getting involved in university or community life. For Participant 7, who had only been staying in Tasmania for two months, cooking provided a means of meeting and socialising with new people, and of exchanging language and culture.

Researcher: '*Have you made friends with the people in the English Language Course or have you met other people here?*'

Participant 7: *'I like speaking and talking to other people, that's why, even when they come from China or any other place, usually women, I go ask them let's go to Salamanca on Saturday. Let's cook. I have a Chinese friend but she is a minority, Korean Chinese so speaks Korean and cooks Korean food and I learn how to cook Korean food with her'.*

Researcher: *'That's nice'.*

Participant 7: *'See, it's Tasmania so I can cook Indonesian food, Korean food, Japanese food, or Australian or western style food'.*

Researcher: *'It is multicultural in a way'.*

Participant 7: *'Yes'.*

When discussing their interests many participants mentioned their concern towards work and study and how it impacted their free time. This underlying concern is captured in an account from Participant 15 as they articulate their personal interest in chess.

Participant 15: '*In Asian countries many countries have their own forms of chess, in China we have Chinese chess, in Japan, Japanese chess, and Korea has Korean chess. The rules are all different'.*

Researcher: '*Really? I've never heard of Korean chess'.*

Participant 15: '*It is similar to Chinese chess, but the rules are different. Thailand has Thai chess'.*

Researcher: '*Fascinating, I know there are a couple of different ones, I didn't know there was so many in the region. So it must be popular -'.*

Participant 15: '*Yeah, Thai chess is popular in Thailand and Cambodia'.*

Researcher: *'Ok. You learn something new every day'.*

Participant 15: *'Yeah. Yeah, that's my hobby as well, to do some studying of these types of traditional culture'.*

Researcher: *'So you do that in your spare time'.*

Participant 15: '*Sometimes, but not too much. I don't – because I play chess I focus on the different forms; I mean the forms from different countries'.*

Researcher: *'And how did you learn about the different types of chess?'*

Participant 15: *'Through the internet. Actually, I talk with people as well. When I was in Japan I talk with people and play Japanese chess. They had some events for those chess from other countries. So I joined the event'.*

Researcher: *'And you haven't found anything like that down here?'*

Participant 15: *'Here? No, I haven't. I don't have much time to do that here. It is just study and work'.*

This exchange with Participant 15 highlights the division of life into work, study and free time for an international student while staying in Tasmania. All participants found balancing everyday life to be a challenge, some discussed how their interests changed or that they were not interested in certain things now that they were staying in Tasmania, life circumstances had changed. Setting priorities was also important, and the order of things in everyday life reflected this. For Participant 11 being interested in movies was not just a leisure activity, watching a movie was a learning activity motivated by the need to learn English. This priority influenced the criteria used to select which movies to watch, and how often.

Researcher: *'So we were talking about movies then. How do you find out which movies you want to watch'?*

Participant 11: *'Actually I don't watch the new release movies. I just watch the movies which is good for my English practice'.*

Researcher: *'How do you find out which ones to watch though'?*

Participant 11: *'You can learn a lot of information and English knowledge from a movie that is not far away from our life. I always watch movies which are very close to our life so I can pick up some sentences and some words'.*

Researcher: *'Like drama'?*

Participant 11: *'Yeah like drama or some romantic movies. Yeah action movies can help but not as much'.*

Researcher: *'Yeah not a lot of talking'.*

Participant 11: *'Yeah I pick some daily movies close to the life so I can pick up'.*

Researcher: *'So it is helpful to do that. So how do you choose which ones you watch'?*

Participant 11: *'How can I choose'?*

Researcher: *'Do you ask your friends'?*

Participant 11: *'I don't usually choose them. I can watch the same movie or the same drama up to 20 times. Actually I watch a TV series it is four seasons and I watched the TV series four times'.*

Researcher: *'So it is for study that you watch it'?*

Participant 11: *'Yeah I watch movies for studying, not for fun actually. But in the meantime I have fun'.*

Researcher: *'So you enjoy watching them even though you are studying'.*

Participant 11: *'Yeah to improve my English. Yes I do'.*

9.4.3. Information seeking

This section presents the Master theme of 'Information seeking' and groups super themes related to participants' information seeking in everyday life. Here the most important super themes were staying-up-to-date and information sources, all interrelated parts of the information seeking activity. These and other related super themes are listed in Table 33.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Staying up-to-date	Y	N	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y
Information	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Information source	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Information channels	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
Information aggregation	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Verifying information	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
Finding information	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N
Information practice	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N
Information grounds	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
Information preferences	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
Searching	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Information management	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Local information	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
Information sharing	N	N	N	Y	N	Y	N	N	N	N	N	N	N	Y	N
Wrong information	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Confirming information	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Information seeking	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Making decisions	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Information gathering	N	N	Y	N	N	Y	N	N	N	N	N	N	Y	N	N

Table 33: Super themes grouped under the Master theme 'Information seeking', where N = no, and Y = Yes.

A vignette from Participant 13 captures the relationship between 'Information seeking', 'Information sources' and 'Staying-up-to-date'; the participant had a clear mental image of their information horizon but it was a systematic image where information was gathered, aggregated and managed through sources which kept them up-to-date and seek information when needed. The participant was finding it difficult to write down concepts on their ISH map and to discuss them individually, so a gentle nudge was necessary:

Researcher: *'Yeah look whatever comes to mind and just talk me through what your thinking is'.*

Participant 13: *'So whenever I need to know something first I go to Google and from there forwards it comes down to all other sources. But Google is always the first one. In terms of Facebook, once I have Googled something, I then subscribe or like the certain pages for example, I found that there's a way to meet Uni friends, I found that via Google so all those pages like Uni friends and UTas*

Bushwalking Club or Hobart Bushwalking Club not connected to the University, all those clubs and communities. It is easier to subscribe to them by Facebook rather than any feeds or anything. So the next one is events, some of them I get to know from Facebook, when is the next meeting or anything. But I have written in there a separate section from Facebook or Google or anything because I have my Google Calendar where I keep track of my different events which basically gathers the information from Facebook or from other pages where I am subscribed and it all congregates it in the calendar. So this is my ultimate source, on my mobile phone because I have got android and on the desktop there is this, you know you can flip through different screens, and on one screen is allocated for my calendar which I have in the weekly view and I have the whole view for whatever meetings and events that are happening so I can anytime decide whether I want to join or not. For the events it is already under mobile apps, there are such groups as meet up or different others according to my interests, different groups who also feed their events to my calendar. That is why out of all them, like Facebook as well gets it. Everything goes down to my calendar which becomes my ultimate source. But this is just a secondary source, because the first source is Google...'.

In an exchange with Participant 9, the importance of information encountered in the environment is apparent. After only having been in Tasmania for two weeks they had worked out where to go shopping, how to cook food and how to find the best prices. Participant 9 was young, with limited experience looking after themself and was struggling with the difference in language.

Researcher: *'Ok. What else? What other things have you tried to find information about while you have been here?'*

Participant 9: *'When I go to the market'.*

Researcher: *'Salamanca Market'.*

Participant 9: *'Salamanca Market or Coles or Woolworths and I get the paper advertisement…'.*

Researcher: *'Newspaper'?*

Participant 9: *'No'.*

Researcher: *'Magazine'?*

Participant 9: *'No. It just says how much is that, many stuff, cost of the food? So I have been going there and then I come back home and I see what is in the paper and I can know the price of stuff and which supermarket is better'?*

Researcher: *'So where to get cheaper food'?*

Participant 9: *'And when should I buy the stuff'.*

Researcher: *'So you look for the ad, the information about where to go shopping'.*

Participant 9: '*Yes and recipes, how to cook stuff, I can know that paper'.*

Researcher: *'Ok and where have you found, which is the best place to go shopping'?*

Participant 9: *'Where I buy the vegetables? I go to Coles and other things I want to buy I go to Woolworths'.*

Researcher: *'Ok. And you have found those places out by looking at the information about the costs. That is good, you figured that out quickly, you have only been here a few weeks'.*

Participant 9: *'Yeah'.*

For Participant 15 receiving the wrong information, and trusting information sources, were important concerns. In their account, emphasis was placed on checking information using multiple sources. The criteria of trust highlights how Participant 15 values their sources, but the sense arising from the conversation is that it is a personal issue, for instance it may be interpreted from the following extract that 'you get in trouble for getting the wrong information'.

Researcher: *'Very different, wouldn't it be. What else comes to mind? What we're trying to do here is build a picture of where you go and find some information a*

bit generally. So, if you're going for a trip, you might talk to your friends, do you think that – do you find anything useful from going to friends, do you follow any of their stuff, on Facebook or'?

Participant 15: *'Usually, yeah. I'll find that first and confirm myself, sometimes people got wrong information'.*

Researcher: *'Do they? Is that like the stuff they post up on there – the stuff they tell you'.*

Participant 15: *'It just says something that they thought, like that, and then they just say something untrue. They just say something occasionally'.*

Researcher: *'Oh Ok, occasionally'.*

Participant 15: *'They got idea you, you follow that, you get into trouble, which is – you got wrong information – probably some problem'.*

Researcher: *'So you don't really trust it'?*

Participant 15: *'I will confirm definitely if I heard something, I would confirm'.*

Researcher: *'You confirm it with other people'?*

Participant 15: *'Confirm from the internet or other people, and go and find yourself'.*

9.4.4. Experience

This section presents the Master theme of 'Experience' and groups super themes related to participants' experience of everyday life. Here experience is coupled with reflection. Reflection is a broad super theme that encompasses deeper self-reflection while alone, growing up, and the everyday thoughtfulness. It presents international students' experience of status – their place in society, their own circumstance and serendipitous encounters which have had an impact on their lives. These super themes are listed in Table 34 along with the participants to which they were important.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Experience	N	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
Everyday	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N
Observations	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Self-reflection	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
Growing up	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Circumstances	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y
Serendipity	N	N	N	Y	N	N	N	N	N	N	N	N	Y	N	Y
Being alone	N	N	N	N	Y	N	N	N	N	N	Y	Y	N	N	N
Reflection	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Status	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y

Table 34: Super themes grouped under the Master theme 'Experience', where N = no, and Y = Yes.

Participant 15 provided an insightful reflection of life in Tasmania and in their view the lack of 'status' or competition experienced during their stay. The participant's account illustrates how social status, for example involving the ownership of an iPhone (an object and symbol of status), may be an important socio-cultural criterion for preferring certain information sources. Source selection might not be such an objective, needs based assessment that it is often made out to be.

Participant 15: *'Yeah, right – Tasmania is really good place, not many distractions'.*

Researcher: *'Very quiet – what do you like most about being in Tasmania'?*

Participant 15: *'You don't need to [compare] with other people actually. Actually the country I come from, I mean China, or I used to live in Japan, people usually compare with each other, for example, you have got some things, something sophisticated, something new, for example, an iPhone, then it's really to show your social status'.*

Researcher: *'Yeah'.*

Participant 15: *'If you don't have then, probably – I don't know how to explain – that you just don't have'.*

Researcher: *'Not as important'?*

Participant 15: *'Probably you won't be treated equally in some situations, but here, people don't mind, they just live in their way. I think that's really good for me, because I don't want to compare with other people, yeah, compare, using those stuff'.*

Researcher: *'Yeah, like status symbols'.*

Participant 15: *'Symbols, yeah'.*

Researcher: *'Having to fight for who's better or who has what – it's a little more relaxed here for sure'.*

Participant 15: *'You don't have that stuff in China or Japan, sometimes you will be mocked and people make light of you and things, but here it doesn't matter. But there are probably some other issues here. Some, I'm not quite sure, I haven't experienced too much myself, but you know, some racist – things like that'.*

There were many circumstances where participants identified with the researcher (being students themselves) and reflections of the experiences of being a student were shared. For Participant 12 this involved a moment where conversation shifted to the experience of talking to 'yourself' in the context of needing a working mobile phone to staying in contact with friends and family.

Researcher: *'And how did you find out where to get a sim card? Did someone tell you or did you just sort of look it up'.*

Participant 12: *'A supervisor told me that if you can't find it on, at my accommodation it is close to Coles and Kmart but I could not find any Nano SIM card there so they told me to find it at a gas station so I just randomly walked around the city to find a gas station which was fun because I like exploring as well so once I found one. The first gas station I entered actually had a Nano SIM card but on my way back I encountered several gas stations and when I asked if they had any Nano SIM card they said no. It was pretty lucky that I got it at the first place'.*

Researcher: *'Yeah it is, it is a bit random around here. And if you were to lose your phone, how long do you think you could last without it'?*

Participant 12: *'Despite the chatting and the interaction with friends, I think I could live with it but I need the constant interaction with my family and friends because I am the kind of guy who for instance if I don't speak to anyone I am talk to myself'.*

In the conversation which followed the sensitive topic of the participant's mother passing away was discussed and how in their view it has led to them talking to themself when they are bored. This was an honest and personal reflection shared by the participant, which gives great insight into their personal motivations and life situation.

Researcher: *'You are a student, I do that when I program, I talk to the computer and I am like, why won't you work'.*

Participant 12: *'Some people talk to their computer but I don't know why, in my position I talk to myself and it is like another me answers my questions and I just keep on talking and this one time my friend came into my room and he just closed the door and was like, ok. He just ran away and I had to talk to him and say I am not crazy, it is something I do when I am bored'.*

This account has been chosen to illustrate that the participants are human, as are all information seekers. Their experiences shape their need, for instance having a mobile phone to stay in touch with people you can talk with, who in turn will be the people that you will go to for information when a pressing need arises. The development of this resource is through human factors, and part of being human.

9.4.5. Arrival experience

This section presents the Master theme of 'Arrival experience' and groups super themes related to participants' experience of everyday life at the point of arrival in Tasmania. Issues associated with arrival including accommodation, meeting people, navigation, getting lost, transportation and being prepared for the experience. Settling in, or settling down as it was called, was fundamental to the experience, and asking for information and advice was

important for a positive outcome; as was meeting people, particularly your neighbours or people at the university for the first time.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Arrival experience	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Settling in	Y	Y	N	N	N	Y	Y	N	Y	Y	N	N	N	N	N
Meeting people	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
Being lost	N	N	N	N	N	Y	N	N	N	N	N	Y	Y	N	N
Transportation	Y	N	Y	Y	N	Y	N	Y	Y	N	N	Y	N	Y	Y
Accommodation	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N	N
Preparation	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Advice	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Settling down	N	N	N	N	N	N	N	N	N	Y	Y	Y	Y	N	N
Navigation	N	N	N	N	N	N	Y	N	Y	Y	N	Y	Y	Y	N
Seeking advice	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
University people	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N
Neighbours	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Asking for information	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N

Table 35: Super themes grouped under the Master theme 'Arrival experience', where N = no, and Y = Yes.

Two important issues concerning participants were 'accommodation' and 'transportation' when they arrived in Tasmania. These issues were entwined with the process of settlement, whether it was referred to as settling in or settling down, the meaning was the same. The experience of Participant 10 provides a glimpse of what a positive arrival experience, which meets an international student's needs, might look like.

Researcher: *'When you arrived here did you have any friends or family here'?*

Participant 10: *'Not family but I did have friends. One of my friend was very close to me, so that is why chose Tasmania to study further. I could have chosen Melbourne or Sydney but I chose Tasmania because of my friend. He has lived along with me in my own country. He is studying Masters of IT here'.*

Researcher: *'Ok so your friend recommended you to come here'?*

Participant 10: *'Yeah'.*

Researcher: *'That is good. It is good to know someone when you come to a place like this'.*

Participant 10: *'Yes'.*

Researcher: *'And so you arrived, what was your accommodation like when you got here? Were you up at the Uni accommodation'?*

Participant 10: *'No. I moved straight in to my friend's home and he has got an apartment, 2 bedrooms and a living room. I stayed around 1 week with him and then eventually I moved to some other place and stayed there for 2 weeks and then I get moved to the place where I arrived the first time and got settled down there'.*

Knowing people, or at least having access to people, is an important factor in the arrival experience. In many cases another person will help a participant overcome some issue, such as a lack of information or in the case of Participant 9, a lack of transportation as well.

Researcher: *'And how about finding food and things to eat and doing shopping, has that been easy'?*

Participant 9: *'Ah, yes but I ask a woman, I don't know her, just meet on the road. But she is very kind and she told me the way to go to the shopping mall so I can find shopping centre easily'.*

Researcher: *'So that wasn't too hard. And what about getting there, transport? Do you walk or do you catch a bus? Do you know how to do that yet'?*

Participant 9: *'Sometimes I get the bus. It is not difficult but when I went to the zoo there is no bus, no timetables, so I can't go by bus so my friend catch a taxi so went to the zoo by taxi'.*

9.4.6. Goals

This section presents the Master theme of 'Goals' and groups super themes related to participants' goals – an element of their teleo-affective-structure (Savolainen, 2008), influencing everyday information practice. Here the super theme of work emerges, accompanied by working and job seeking. This goal is an important focus for many

participants. Work is followed by study, achievements and motivations (for staying in Tasmania) and permanent residency (a kind of motivation) as additional goals to work. In an interview each participant was instructed to focus on interests aside from work and study, which are considered specialised domains of knowledge and thus information practice. What emerges here is that these domains are inseparable for an international student, they define their everyday life and occupy the interest of participants in this study. Table 36 lists the super themes and related participants.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Goals	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y
Work	Y	Y	N	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y	Y
Working	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N
Permanent residency	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Motivations	Y	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N	N	N
Career aspirations	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Achievement	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Job seeking	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Study	N	N	N	Y	Y	N	N	N	Y	Y	Y	N	Y	Y	Y

Table 36: Super themes grouped under the Master theme 'Goals', where N = no, and Y = Yes.

For Participant 13, work, study and their career played on their mind, and the immediate need to have an income influenced decisions they were making, such as where to live and how to study. Their search for employment meant talking to recruitment agencies and companies outside of Tasmania in places such as Melbourne.

Participant 13: *'There are no part time marketing positions in Hobart at all. And I have been speaking to this careers counsellor at the Uni, I have been speaking to some recruitment agents in the city, they all say look, marketing in Hobart, you are kidding us'.*

Researcher: *'Oh dear'.*

Participant 13: *'Yeah for this reason I have been in touch with Melbourne companies and...'.*

Researcher: *'There are lots in Melbourne'.*

Participant 13: *'Heaps'.*

Researcher: *'Yeah, because I was looking at the Universities for work and they all have lots of these jobs. Like International Student Liaison communication person, International Marketing, things like that'.*

Participant 13: *'Yes Melbourne is a very promising place for my career and I am in Hobart now and considering that I have to see my supervisor very often, I am even obligated to see him every two weeks, well I have to stay over here. But also you know this clash between I have to stay here for the supervision and on the other hand I have to have a job'.*

Archery was an important interest for Participant 2, but getting a full time job once studies were finished intruded on the conversation. They felt that there needed to be 'enough money' to spend on their hobbies before they could be pursued, sports like archery or for physical fitness.

Participant 2: *'So I really enjoy archery. Once I finish my studies and get a full time job, because by then I will have enough money to spend on my hobbies, I would like to join a gym. I find myself very skinny and I would like to be slightly broad'.*

9.4.7. Valuing sources

This section presents the Master theme of 'Valuing sources' and groups super themes related to participants' experience of information seeking. The reasons for an international student to value a source or channel were diverse and highly individual. Participants found it challenging to reflect on why a source or channel was important. Importance shines through participants' accounts, embedded in their everyday life experience. Table 37 lists the super themes grouped under the Valuing sources Master theme; there is a long list of super themes but they do not arise often with most participants being associated with only one to three super themes.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Value	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Trust	N	N	N	N	N	Y	Y	Y	N	N	N	Y	Y	N	Y
Feedback	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Contact	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Preference	N	N	N	N	N	N	N	N	N	N	Y	N	Y	N	Y
Quality	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Following sources	N	N	N	Y	N	N	N	Y	N	Y	N	N	N	N	N
Preferring sources	N	N	N	N	N	N	N	N	N	Y	N	Y	N	Y	Y
Finding sources	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Reaching sources	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Choosing sources	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
Source preferences	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Recommendations	N	N	N	N	N	N	N	Y	N	Y	N	Y	N	N	N
Using sources	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Valuing sources	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y

Table 37: Super themes grouped under the Master theme 'Valuing sources', where N = no, and Y = Yes.

Participant 8 had a lot to say about how they valued information sources and channels while staying in Tasmania. Particularly people close to them were valuable sources of information, for instance their husband and host M_ (the participant is living in a home stay arrangement):

Participant 8: *'The husband he is also a student here at UTas. He is not currently, he is on a semester of leave, because he also runs a company. So if I have questions like about our free time activities, we can ask the people because they know the area, the woman, Moira_ she also likes to go hiking so we can ask her about hikes we can do. He recommends to me most of the books that I read and if I have trouble with Uni he can also give me advice'.*

Researcher: *'So they are quite valuable in terms of...'.*

Participant 8: *'Yeah'.*

Researcher: *'You trust them, the information is usually good quality'?*

Participant 8: *'Yeah, and also there is good feedback loop going on I would say because if he recommends me a book then of course we talk about it as well. Or if she recommends me a walk then we talk about it afterwards'.*

The internet was an important information source and channel for Participant 8, it connected them with people who shared their interests. Having a shared interest and related experience were important criteria for Participant 8 when choosing a source or channel and they valued having a personal connection.

Researcher: *'Have you used the internet much to look up things about that'?*

Participant 8: *'We have looked at the internet a little bit for deciding whether we want to go from the mainland to Borneo, we haven't decided that yet so we look at what other travellers recommend, maybe we look at blogs, but I find that information not very accurate because people experience the same situation very differently. We look at flight tickets and different prices and different areas but mainly we try to find people that we know and we then can evaluate what they say about their own experience would be similar for us. Because if you know they like the same stuff then what they recommend would probably be good for us, whereas if they are people we don't know on the internet writing about stuff and how they enjoyed it, we don't know if that would be the same for us because we don't know how their interests are normally'.*

To Participant 8 being in contact with local people was important, and they were valued for their local knowledge and cultural experience. To Participant 1 knowledge and experience are also important, hearing from friends first is preferred when seeking information about activities 'no matter how good it looks on the internet', but the internet was also considered a reliable source of information.

Researcher: *'So I am interested in where you get the information from and also why that source is important or useful for that task, that kind of information. So like when you put friends and you put internet, there is obviously a reason why you would go to that first over other sources'.*

Participant 1: *'Ok yeah. So the reason why I go to friends for camping is because they already have knowledge, experience, some of them they go and do a track and they come back and talk to you about it and you feel excited and you want to do it. So that is why. When it comes to these activities, I always*

prefer to hear from friends first. No matter how good it looks on the internet, if someone has already done it, they will definitely tell you about it and you will get a better idea. Aurora, movies and holidays I use the internet because it is a reliable source of this information. And the most important is that they will send you the notifications especially with booking tickets for holidays or for aurora, you won't do it without internet because you need notifications for that'.

9.4.8. Social interaction

This section presents the Master theme of 'Social interaction' and groups super themes related to participants' experience of information seeking. The Master theme is primarily defined by having friends and socialising, but friends include all kinds of people – other people, local people, partners, and strangers. Knowing people, and not knowing people, were important issues for participants, and socialising through activities like parties was considered an important interest in participants' everyday lives. These themes are summarised for participants in Table 38.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Friends	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
Parties	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N
Partner	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Strangers	N	N	N	N	N	N	N	N	Y	N	Y	Y	N	N	N
Knowing people	N	Y	N	N	N	N	N	Y	N	N	Y	N	N	N	N
People	N	N	N	N	N	N	N	N	Y	Y	N	N	Y	N	N
Socialising	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	Y	N	N
Finding people	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N	Y
Asking people	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
Other people	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Local people	N	N	N	N	Y	N	N	Y	N	N	N	N	N	N	Y
Not knowing people	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
Local activities	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Community	N	N	N	N	N	N	N	Y	N	N	N	Y	N	Y	Y
Event	N	N	N	Y	N	N	N	N	Y	N	Y	N	N	N	N

Table 38: Super themes grouped under the Master theme 'Social interaction', where N = no, and Y = Yes.

Social interaction was seen as important by all participants, and having friends particularly important, with the exception of Participant 14 where the Master theme and super themes were not present. Interestingly, people and social interaction were important but it was the activity or place where people meet that was most important. An account from Participant 14 about staying up-to-date with their interest in soccer highlights the importance of prayer and the mosque in their information seeking, where people and information meet.

Participant 14: *'Yeah because I met them in the mosque, the prayer room, so that is sort of meeting up'.*

Researcher: *'Meeting up and finding out what is going on'.*

Participant 14: *'Yeah'.*

Researcher: *'Do lots of people go to the mosque? Or the prayer room'?*

Participant 14: *'Yeah. The prayer room. Now actually on Fridays it is too small for us, we upgrade to the TUU multipurpose hall'.*

Researcher: *'Yeah do they give you that space'?*

Participant 14: *'Yeah but not now because there are exams'.*

Researcher: *'Yeah because they have got exams'.*

Participant 14: *'Yeah after exams I think we will get it. Because the whole semester we had the place, only maybe two weeks we didn't have it. Other than that all the weeks we had the place. But I think they have been talking to the Uni and they are trying to get a new place for the mosque'.*

[…]

Participant 14: *'In the month of Ramadan, we have, it's called Iftar, we break the fast. it is arranged everyday in the mosque so anyone can come, it is free. Anyone can come. So at that time it is like a huge gathering so everyone will talk to each other. But we don't talk much about...we don't go in depth into study issues and things but the social things and the general things, not much*

deeper. But for example if I am doing something about the determination thing, there are a couple of people who have done this so if they find me doing this they will come and help. If I am at the mosque trying to figure out this and this, and if I ask someone who is doing this, they will help. A helping hand for anyone doing surveying in the first year and he asked me whether I know this and this, I help him so it is like a free consultation information hub in the mosque'.

In terms of their information value friends were not seen as a 'main' source of information. But interaction with friends was valuable, and for Participant 8 different groups of friends were of different value to them. Generally, 'friend' meant someone who you were close to or known for a long time, these friends were usually people back home. People met along the way were friends, but not 'close friends'.

Researcher: *'Where would you put friends generally'?*

Participant 8: *'Just friends generally, I feel like here they are not so much my main source of information because I don't know very many people very well. So I would even put them further away than the Uni friends because they give me different sorts of information but not on a regular basis so I would put them here'.*

Researcher: *'I suppose a way to think about it is how frequently would you use friends to find things out for something in particular. Like if you went to them every day they might be more important than if you only occasionally...'.*

Participant 8: *'Yeah and that is it here, because a lot of people I have met and I met them a few times and have done a few things with and I would consider them my friends but they are not a close as people, my friends in Germany because I have known them for a lot longer'.*

The kinds of groups which friends were placed in varied, and to Participant 4 these were 'work friends' (work here is study at the university) who were close by and who shared the same work experience and 'outside [work] friends' who were more distant, and who you might bump into or communicate with outside of work.

Researcher: *'What about just general social stuff, like you mentioned going out after work or just catching up, how do you stay up to date with what people are organising in that sphere'?*

Participant 4: *'Friends. That is just talking to friends. I would say I have two sets of friends. I have my work friends and we sit right next to each other so we just ask around, who wants to go for a drink, raise your hand'.*

Researcher: *'So fellow PhD'?*

Participant 4: *'Fellow PhD's. All in the same boat. All the same age, same interests. And then I have my outside of Uni friends. And then we just text each other, do you want to meet up and that's it. Or bumping into each other in the Woolworths'.*

[…]

Researcher: *'Because you have used friends quite a bit there, so you have obviously got a pretty comprehensive social network happening here'.*

Participant 4: *'Yeah I guess since you are part of different clubs you have different groups of friends and it is quite nice to have different subsets because people have different interests. So I can talk to my work friends about how my PhD is going and they understand that. If I talked to my rafting friends it would go over their head, when I start talking about demographics and stats. And I have my friends who I can talk to about my personal life and everything. Rafting friends who are great for a laugh. Friends back home who I have known since I was like 7 years old and I can always rely on them. I can call them up at god knows what time and they will always be there which is brilliant'.*

The role of friends, people and social interaction in everyday life for participants is central but the relationship is complex. Having friends and interacting is an important issue, it was a struggle to some, and other found it to be a natural process. Interacting with people socially is

essential for the activities of everyday life and the accounts of the participants highlight how these define their friendship groups and their perceived roles and place in practices such as information seeking. The activity of making friends was rarely described, and people were met and friendships established mostly in a serendipitous fashion during the course of everyday life and specifically during activities. Making friends was something that Participant 1 struggled with.

Researcher: *'Yeah so always getting socially involved with things that are going on. And how did you find it, you have been here for a little while, but when you first arrived, did you find it difficult? What was it like to turn up in Tasmania'?*

Participant 1: *'Yes. It was really difficult, especially as I didn't know anybody here. I haven't met anyone from my community, absolutely, still now and yeah it was really hard. That is why I started to attend all these events and after I started attending them I started organising them and give the help for managers there and leaders to get these events done. Yeah so that was my way through to University to make friends you know'?*

9.4.9. Living in Tasmania

This section presents the Master theme of 'Living in Tasmania' and groups super themes related to participants' experience of information seeking. The Master theme stands strongly by itself, the experience of living in Tasmania was associated with living overseas, experiencing Tasmania and of Hobart. Interestingly, driving or transportation was an issue raised in many conversations, not necessarily as a huge problem but as something on the minds of participants during their everyday lives. It was something which needed their attention. These themes are summarised for participants in Table 39.

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Living overseas	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Driving	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y	Y
Experience in Tasmania	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N
Hobart	N	N	N	N	N	N	N	N	N	N	Y	Y	Y	N	N
Living in Tasmania	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Staying in Tasmania	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y

Table 39: Super themes grouped under the Master theme 'Living in Tasmania, where N = no, and Y = Yes.

For Participant 11 getting their driver's license was essential, they wanted to get it before coming to Tasmania but did not have enough time between finishing their university entry exams and taking up study in the University of Tasmania. To them having a driver's license is a survival skill while living in Tasmania.

Participant 11: *'So I use WeChat to contact my friends. I will go back to China after the semester for my holiday'.*

Researcher: *'Back to visit friends and family'?*

Participant 11: *'And to learn how to drive. I just graduated from High School so I don't have driving lessons. I finished my examination of the entry to University, the biggest thing in China'.*

Researcher: *'Yeah the big test that you do. I had a friend that did that'.*

Participant 11: *'I did it too. And I just finished it at the middle of June and I came here in July'.*

Researcher: *'That is really quick'.*

Participant 11: *'Yeah I don't have enough time to get a driver's licence. But here a driver's licence is a survival skill'.*

Distance defined the experience of living in Tasmania for participants, and the particular impact that distance had on the experience was defined to an extent by transportation, of driving, walking or catching the bus. As Participant 3 points out being able to drive was not essential and once they started driving it changed the experience and the issues that were relevant in everyday life.

Participant 3: *'So I never used to drive, I always caught the bus and I lived near the colleges, I didn't really need to catch the bus because I lived up hill. In terms of going to the supermarket I used to walk there and then catch a cab back because it was up the hill and there was no way I was going to carry food up. That was when I was living in apartments and stuff. But I used to catch the bus to the city. When I moved back here again I lived on King Street, so it was walkable. I pretty much walked everywhere. I*

occasionally I caught the bus, if I was at Uni and wanted to go into the city, but other than that I would walk. And now I drive'.

Researcher: *'Has that made a big difference'?*

Participant 3: *'Yes, things are so much easier driving, just getting everywhere in 2 seconds. Even though I live really close to everywhere I still drive, it is much easier'.*

Not being able to get around sometimes prevented a participant from attending events or activities, as was the case for Participant 12 who lived far enough away from the university of Tasmania to not feel like the travel was worth it. Visiting places in Tasmania was an interest shared by many participants, sightseeing and enjoying the island's natural beauty. Their ability to pursue this interest depended greatly on access to transportation.

Participant 12: *'Some events like that Independence Day, they mostly have simple events like shopping together or sometimes we hang out in someone's house. But I rarely join those kind of activities because, their activities usually happen around the University and my place is in New Town so I need to get a bus again so it is pretty annoying'.*

Researcher: *'Anything else that comes to mind in terms of where you get information from? Do you get any information from the people that run your hostel'?*

Participant 12: *'Actually maybe I should put supervisors here. So supervisors they really help us a lot, like questions about the city, like the buses. The first time I came here I didn't know how to look at the bus timetable so actually they walk me to the bus stop and show me how to look at it. They really help me a lot on the first month of my stay in Hobart, like the University and stuff, but today they are more like friends so they recommend me some good places to eat or even they ask me to join in to have a dinner together in the city which is pretty interesting. Because they mostly have more experience than I do so sometimes they share the good places to visit here, like Bruny Island or Mt Wellington. They even once asked me whether I wanted to join them to go to Mt Wellington but assignments were due'.*

9.4.10. Change

This section presents the Master theme of 'Change' and groups super themes related to participants' experience of change while staying in Tasmania. Change related to adjustment, and participants recalled their experience of life change leading to adjustment. Changing horizons, behaviour and habits were all mentioned. Wanting to resist change also emerged as did issues around breaking existing habits. A participant's horizons did expand though, new rituals were established and they adjusted to new life circumstances. Assistance and support were relevant, to help participants cope with the changes they experienced in their lives. Super themes and associated participants are summarised in Table 40. An extract from the account of Participant 12 simply highlights the issue of life change, leaving some interests behind and possibly growing up.

Researcher: *Yeah so there is a lot of that which happens around here too. Do you do any of those kinds of things now that you are here or is that not something you have really had time for? Or no one does that here? How has that been for you?*

Participant 12: *Because I didn't bring my stuff here, like the cards and stuff so if I had to purchase it again I think it is going to be a waste of money because I have got lots of good cards back at home. So maybe I will bring them here next year.*

Researcher: *Ok. That is an interest but that hasn't followed you here.*

Participant 12: *Yeah I didn't know that Yu-Gi-Oh! cards are still, because in my home country it is dead, like nobody plays it anymore, except for the rich kids when they play online and stuff.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Change	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Adjustment	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ritual	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
Issue	N	N	Y	Y	N	N	N	N	Y	N	N	N	Y	N	N
Breaking habits	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Habits	N	N	N	N	N	Y	N	Y	N	N	N	N	Y	Y	N
Strategies	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Changing horizons	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
Changing habits	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Expanded horizons	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Resisting change	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Changing behaviour	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
Support	N	N	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Assistance	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Finding help	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y

Table 40: Super themes grouped under the Master theme 'Change', where N = no, and Y = Yes.

9.4.11. Personality

This section presents the Master theme of 'Personality' and groups super themes related to participants' experience of information seeking and interests. Personality emerged as an important factor in how participants approached interests or issues in their everyday lives. Choosing not to do things, making assumptions, desiring privacy or avoiding things played on their approaches to pursing interests. Whether they were comfortable asking for help, whether they liked or disliked a certain information source or channel, these factors had a role to play in defining their information seeking and interests that were relevant. Table 41 list the super themes and associated participants. An extract from the account of Participant 11 highlights how personality influences interest. The things that are important to one international student are not necessarily important to another.

Researcher: *'Things to do when you are not studying'?*

Participant 11: *'Sleeping? Or watching movies. I don't have many interests like playing piano or playing guitar or singing or dance. Never. But I love watching movies'.*

Researcher: *'So movies, that is one. Do you do things like watch the news at all'?*

Participant 11: *'No I don't watch the news'.*

Researcher: *'No news'.*

Participant 11: *'No sports, I never do sports'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Personality	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y
Not doing things	N	N	N	N	Y	N	Y	Y	Y	N	Y	N	N	Y	N
Asking for help	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Assumptions	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Commitment	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Altruistic personality	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Privacy	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N
Avoiding things	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Dislikes	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N

Table 41: Super themes grouped under the Master theme 'Personality', where N = no, and Y = Yes.

9.4.12. Culture

This section presents the Master theme of 'Culture' and groups super themes related to participants' experience of information seeking and interests. Culture is a broad topic, here the difference between life in Australia was contrasted frequently with life in other parts of the world such as Japan or China. The issue of culture as opposed to national difference was also present, transnational differences in things like infrastructure – internet access, accommodation, transportation etc. were raised. But culture still played its part in defining interests and information seeking, language was a particular challenge and of interest to many participants. This was evident is several interviews where language got in the way of smooth conversation, but it never prevented it. Super themes and associated participants are listed in Table 42. An extract from the account of Participant 10 illustrates the interplay of culture, trans-nationalism and everyday life.

Researcher: *'So where do you find out about the books you read'?*

Participant 10: *'Mostly on the twitter handles, because there is one particular author which I like most, I told you earlier, and he has written up to now 5 books and his*

6th book is out on the market, I haven't ordered it yet because I thought I haven't read the 5th one, why should I read the 6th. The name of the 6th one is Half Girlfriend. That created a lot of buzz there in India because people in India are not into reading literature and their English is quite weak. But he writes very simply, he doesn't write in a particular fashion like some British scholar, he writes pretty much in English and that connects with the common people so that is why people started liking his initial books. A couple of books in the beginning and now he is a star and he writes really…'.

Researcher: *'That's really cool. You don't hear much about authors from other parts of the world, well I don't. I hear a lot about western, European authors, but not from India'.*

Participant 10: *'I tried to read in the beginning Shakespeare and all that stuff but I found it really hard. I had really been interested in reading Hamlet or something. But I read Julius Caesar and I had read to some extent those things'.*

Researcher: *'Where would you buy books? Can you get books from your home over here? Do you have to get them from India'?*

Participant 10: *'The internet mostly, we order on the website flipcard.com. We just order it and it delivers here'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Culture	N	N	N	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y
Trans-nationalism	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	Y
Australian society	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Using language	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
China	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Language	N	N	Y	Y	N	N	Y	N	Y	Y	Y	Y	N	N	Y
Culture shock	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Nationality	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Tasmania	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
Japan	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y

Table 42: Super themes grouped under the Master theme 'Culture', where N = no, and Y = Yes.

9.4.13. Staying in touch

This section presents the Master theme of 'Staying in touch' and groups super themes related to participants' experience of everyday life in Tasmania. Distance defined many spaces of everyday life for participants. Whether it was physical, cultural or social or just overcoming the issues created by distance and managing them, it was essential to everyday life. Staying in touch with people, interests and life at home was part of this adjustment. Family, home and missing home all emerged as important themes in the conversation, and staying in touch is associated with what is important. Family and home were very important to participants. Super themes and associated participants are listed in Table 43. An extract from Participant 3 highlights the extent to which staying in touch is an important everyday issue.

Researcher: *'Do you take much time out of your day to talk to family? How frequently are you in touch'?*

Participant 3: *'Well I am in constant contact with them through text messaging anyway because I am in group conversations with my entire family. People just constantly, I am not replying but if there is anything I will mention, and that way it is a group conversation and people know what everyone else is doing. I try to call mum at least once every three days because she gets upset if I don't. Or if it is obvious that I haven't rung her enough, she will text me and ask how have you been and then you know oh I haven't called in a while. So that is my contact with the family. I don't Skype them, mum doesn't like to Skype'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Staying in touch	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Distance	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Family	N	N	Y	N	Y	N	N	Y	N	Y	N	Y	N	Y	N
Missing home	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Home	Y	Y	Y	Y	N	Y	N	Y	N	N	Y	N	N	N	Y

Table 43: Super themes grouped under the Master theme 'Staying in touch', where N = no, and Y = Yes.

9.4.14. Time

This section presents the Master theme of 'Time' and groups super themes related to participants' experience of everyday life in Tasmania. The division of time was essential to balancing the interests of everyday life. Planning and plans were essential, carefully allocating time and making time to enjoy a weekend were all part of managing everyday life. Time emerges as a preoccupation under many other super themes, here it is made explicit. Super themes and associated participants are listed in Table 44. An extract from the account of Participant 10 illustrates the division of everyday life.

Researcher: *'What are some of your other interests then, let's have a think about some of the other things you do. Like you were talking about books and music'?*

Participant 10: *'Yeah books. I brought 2 or 3 books along with me but I haven't read them because I don't find enough time. I thought that I would have plenty of time and that I would read them. I was on page number 73 when I was on my flight and when I reached here I just finished 77 and I haven't moved further than that. I don't know, I don't have the courage to pick that book up and read. I don't know, there is no time, rush rush, I work in the morning, go to University, come down, eat something, sleep and again like this'.*

Researcher: *'Continually ticking over. So not a lot of time for reading books in the day'?*

Participant 10: *'Not a lot of time, because the time has been consumed by some other things that have become part and parcel of my life now. They are kind of essential'.*

Researcher: *'So things like study'.*

Participant 10: *'Things like study, things like working, things like eating, things like sleeping all the time. I didn't have to worry about those things because my mum would cook for me but now I have to cook for myself. So that is an essential part of my day to day life, like one hour for cooking'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time	N	N	N	Y	N	Y	Y	N	Y	Y	N	Y	N	N	Y
Weekend	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
Division of time	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Managing life	Y	N	N	Y	Y	Y	Y	N	N	N	N	N	Y	N	Y
Planning	N	N	N	N	N	N	Y	Y	N	N	N	N	Y	N	N
Allocating time	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
Routine	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N
Plans	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Meetings	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y

Table 44: Super themes grouped under the Master theme 'Time', where N = no, and Y = Yes.

9.4.15. Finances

This section presents the Master theme of 'Finances' and groups super themes related to participants' experience of everyday life in Tasmania. Financial issues stand on their own as an issue of central importance to the everyday lives of participants. The cost of food, accommodation, transportation and many other things all emerged in accounts of everyday life. The issue of work and study were strongly related to finances, having a scholarship meant not having to work which meant time for study, and other interests. Super themes and associated participants are listed in Table 45. The following extract presents the account of Participant 13 who describes their situation in relation to finances and the need for a scholarship to cover living expenses and that without one they will need to work.

Researcher: *'So you have a tuition fee scholarship that covers the costs of your study'.*

Participant 13: *'Yeah I keep applying for the living expenses, before coming here, I did apply, I was rejected, I will try to apply. I am planning on publishing an article by the end of this year so with the next scholarship round I will be applying for the living expenses scholarship'.*

Researcher: *'That will make you much more competitive having something published recently'.*

Participant 13: *'Yes because even though they don't really mind me applying for this round once again, I don't think there would be any point of doing so because my circumstances haven't changed'.*

Researcher: *'So there is not much more you are adding'.*

Participant 13: '*No'.*

Researcher: *'And do you think that if you don't get one you will have to work'?*

Participant 13: *'I will have to work most definitely because I am supporting myself and my savings are not really that stretchable for the whole length of the PhD. That is why I have already started since the beginning, since arriving, I have already started looking for jobs in the city, in the industry. I am not talking about waitressing or other services but I am talking about the industry because my specialisation is in marketing so I am looking for those positions. But it is pretty hard. Hobart and marketing, it is undoable'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Finances	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Need	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Scholarship	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y

Table 45: Super themes grouped under the Master theme 'Finances', where N = no, and Y = Yes.

9.4.16. Accommodation

This section presents the Master theme of 'Accommodation' and groups super themes related to participants' experience of everyday life in Tasmania. Accommodation or living arrangements were issues that emerged on arrival, and continued throughout a participant's stay in Tasmania. Arrangements varied from living in a hostel, staying with a local family, hosts or housemates in shared accommodation or in a solitary arrangement. In most cases there were issues associated with accommodation, living with co-nationals or local people; for instance, having space and noticing the differences in gender were issues commented on by participants in their accounts of everyday life. Super themes and associated participants are listed in Table 46. An extract from the account of Participant 6 illustrates the issue of accommodation and how it is more than just a need to be met and that there are more issues at play than simply finding a house.

Researcher: *'Ok so you move around quite a bit but that is because you want to, not because you are forced to'.*

Participant 6: *'No, because I want to. I want to stay in a home, and the first house I moved was too far from Uni, the temporary one, the next one the room was really tiny and my housemates started to form a band and they play a lot of musical instruments and I couldn't sleep, I loved them but the noise was too much for me. I moved to the Alexandra Street house. I loved that house but I had to move out because of the TUU, they stopped getting the house on lease. Then I moved to a place and I realised the room is full of mould and I tried so hard to get rid of the mould, and I couldn't. Then I started to get a lot of allergic reactions and the GP suggested that maybe you have mould in the house go and look around, and I could see lots of mould in the house. So they are the reasons. So I think I will stay in the current house for one year'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hostel life	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Co-nationals	N	N	N	N	Y	N	N	N	N	N	N	Y	N	N	Y
Local families	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Hosts	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Housemates	N	N	N	N	N	Y	N	N	N	N	N	N	Y	N	N
Sharing accommodation	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N
Housemate	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Finding hosts	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Space	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N
Issues	Y	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N
Gender	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N

Table 46: Super themes grouped under the Master theme 'Accommodation', where N = no, and Y = Yes.

9.4.17. Identity

This section presents the Master theme of 'Identity' and groups super themes related to participants' experience of everyday life and information seeking. Identity, particularly that of being an international student, a youth or married defined experience for participants. Being independent and strategic were goals and valued achievements. The experience led to identity development and the sense of identity influenced individuals' approaches to everyday life and information seeking. Super themes and associated participants are listed in

Table 47. To highlight the Master theme of identity the account of Participant 15 illustrates that 'being an international student' is an identity and a way of life.

Participant 15: *'Yeah, probably some people haven't been abroad, living in a new place, they may find it difficult – they were used to the place they originally from. They think in that way – so, I reckon most people don't want to have a change, if they used to – they are just used to it and they don't want to have a change. Probably suffer from the situation – they get stuck'.*

Researcher: *'Yeah, everyone has a different reason for travelling – So did you come here just for study, or is coming to Tasmania more than just for the study?*

Participant 15: *Originally – Actually, I haven't been an international student before, so I would like to a taste – have a different kind of lifestyle'.*

Researcher: *'So it wasn't just to do the study, it was part of other things – like lifestyle'.*

Participant 15: *'Actually some things – to some extent, I have been out of school for quite a few years and being an international student – it's some kind of different experience, I am not sure, people might think differently here, but back in my home country, being an international student is actually cool'.*

Researcher: *'So if you've come from overseas'.*

Participant 15: *'Yeah, if you have studied overseas then it sounds really cool, so I'd just try it'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Identity	N	N	N	N	N	N	N	Y	Y	Y	N	Y	Y	N	Y
Dependence	N	N	Y	N	N	N	N	N	N	Y	N	N	N	N	N
Being an international student	N	N	N	Y	N	N	N	Y	N	N	N	N	N	N	Y
Youth	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
Married	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
Being independent	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N
Being strategic	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N

Table 47: Super themes grouped under the Master theme ''Identity', where N = no, and Y = Yes.

9.4.18. Learning

This section presents the Master theme of 'Learning' and groups super themes related to participants' experience of everyday life, interests and information seeking. Many participants had an interest in learning outside of their studies. Learning new skills, language or about culture were interests of many participants, writing and research also featured as interests outside of university life. Super themes and associated participants are listed in Table 48. In their account Participant 4 explained how they learnt about their interest of photography, illustrated by the following extract.

Participant 4: *'I guess next would be photography as well. That is related to my rafting because if I am not rafting I like to take my camera and take photographs of the rafting guys to improve my skills'.*

Researcher: *'Like action shots'?*

Participant 4: *'Action shots and then scenery shots when the guys are gone and I am waiting for them down river. And then I am learning about that through books, like how to take better shots, and YouTube videos about how to set up my camera, the best lighting and stuff like that. So that is how I am self teaching myself. I am doing the photography so I can show my family what I am doing. So I can keep them up to date because a picture is worth a thousand words'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Learning	N	N	N	Y	N	Y	Y	N	N	Y	Y	N	N	Y	Y
Research	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
Writing	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
Learning language	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Skills	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Learning culture	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N

Table 48: Super themes grouped under the Master theme 'Learning', where N = no, and Y = Yes.

9.4.19. Travel experience

This section presents the Master theme of 'Travel experience' and groups super themes relating to participants' experience of everyday life, and their interests. Separate from other kinds of experience, the experience of travel did not only emerge as a conversation focused

on their stay in Tasmania. Many participants were thinking about travel beyond Tasmania, some were planning trips to other countries or a visit back home. Participants did not talk about a dislike for travel, and more often than not travel was an interest which was pursued and enjoyed. When talking about travel to Tasmania, the issues of visas, agendas, application (particularly to the university) and their requirements emerged as important. Super themes and associated participants are listed in Table 49. An extract from the account of Participant 8 highlights the separation of travel, from the experience of living in Tasmania.

Participant 8: *'Well what I am interested in that we haven't really covered yet because it doesn't really have anything to do with my time here, is when I travel home I will be travelling via Malaysia and spend three weeks in Malaysia. So I am now trying to figure out what I am going to do when I am there'.*

Researcher: *'So travel is an interest'.*

Participant 8: *'Yeah of course'.*

Researcher: *'Well for some people coming here it is not about the travel, you get a scholarship and you are here to study. For some people coming here is about the travel, not so much about the study so I guess the motivation for different people changes'.*

Participant 8: *'Yeah while I am here I don't consider myself travelling because I am studying here, but I specialise in International management so for me it is very interesting to meet a lot of different people from different cultures so that is why travel is sort of important'.*

Researcher: *'So you are planning your trip back via Malaysia'.*

Participant 8: *'Yeah and that's partially, I do that here with people because there are a lot of Malaysian students here and I have quite a few friends from Malaysia, and also someone who has already travelled back to Malaysia and she said I should come and visit so that is always good. And also I have friends that I met before that have been in Malaysia a few times and can maybe recommend me stuff that I should do and see. So that goes over Facebook'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Travel experience	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Applications	N	N	N	N	N	N	Y	Y	N	Y	N	N	Y	Y	N
Agents	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N
Travel	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	Y
Visa	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Requirements	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N

Table 49: Super themes grouped under the Master theme 'Travel experience', where N = no, and Y = Yes.

9.4.20. University life

This section presents the Master theme of 'University life' and groups super themes relating to participants' experience of everyday life and their interests. Despite being asked to focus on life outside of work and study, university life pervades everyday life. It emerged through interaction with teachers, lecturers, teaching, training, supervisors or visiting the library for learning resources. Participants' lives were defined by their experience at the University of Tasmania and the role of a university as an environment for information, both specific and every day, was an important part of everyday life information practices. Student societies, and the Community Friends and Networks Program (CFNP) run by the university both were significantly important in the lives of participants. The activities they organised and the people connected to them contributed significantly to the adjustment of participants to living in Tasmania. Super themes and associates participants are listed in Table 50. An extract from the account of Participant 5 illustrates the role of the university through the CFNP in everyday life.

Participant 5: *'Usually the University organises a few programs for Community Friends and Networks, they visit nursing homes and schools and they organise some trips but I am especially interested to go and speak to the old people. The reason because when you speak with an 80 year old human being, we can learn, his 80 years experience in a half an hour conversation. Most of them are very good in explaining what is life, what is 80, what I did, what I did not do, what is good and what is bad. It is very good to speak often, to get 80 years of experience. That is my personal belief'.*

Researcher: *'That is really nice. It is a good way of thinking about elderly people in our society and what they can contribute. So you attend those kinds of things through Community Friends and Networks'?*

Participant 5: *'Yeah'.*

Theme/Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
University life	N	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	N	N
Student societies	N	N	N	Y	Y	N	N	N	N	N	Y	N	N	N	N
CFNP	N	Y	N	N	Y	N	Y	Y	N	N	Y	N	N	Y	N
The university	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N
Library	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N
Teachers	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N
Lecturer	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Teaching	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Training	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Learning resources	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Supervisors	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N

Table 50: Super themes grouped under the Master theme 'University life', where N = no, and Y = Yes.

9.5. Discussion

This part of Chapter 9 presents a discussion of the results from analysis of Information Source Horizon (ISH) maps, and the Interpretative Phenomenological Analysis (IPA) of interview transcripts. Analysis of interview data was conducted to address the study's Research Questions (RQs) which are reproduced here:

- **RQ1:** Which information sources and channels are preferred by international students when seeking orienting information?
- **RQ2:** In what ways are information sources and channels preferred by international students?
- **RQ3:** To what extent and in what ways are mobile phones important to everyday life information seeking practices?
- **RQ4:** In what ways are mobile phones positioned in relation to other sources and channels in international students' Information Source Horizons?

- **RQ5:** How do international students select and value information sources and channels in their everyday information practices?

To address RQ1 results from the ISH mappings indicate that a wide range of information sources and channels were preferred by international students when seeking information. Table 28 presents source and channel categories arrived at through Qualitative Comparative Analysis (QCA) of the concepts inscribed on ISH maps, it shows that Networked sources were the most preferred source by the international students interviewed here, followed closely by Human sources. This was consistent in Zones 1 and 2 but in Zone 3 Print and digital media was preferred over Networked sources. Overall the least preferred source was Social media, but it was significantly more popular in Zone 3 which accounted for 50% the total number of Social media sources inscribed on ISH Maps. Table 29 shows that Zone 2 accounted for the highest number of all sources with the exception of Networked sources, the highest number of Networked sources is recorded in Zone 1 which accounts for 50% of all Networked sources. These results are supported by findings by Savolainen (2007) when studying the information source and channel preferences of environmental activists. The difference is that here an expanded set of categories has emerged from that study. It is clear the digital technology and digital media have a greater impact on the lives of international students interviewed here and thus the category of 'social media' and addition of 'print and digital media' help capture the sources and channels relevant to them (Savolainen, 2007).

RQ2 may be addressed by referring to results from IPA analysis of interview transcripts and the accounts of international students that emerged. Twenty themes emerged that related to the interests (the issues of concern) to international students in their everyday life and conversation topics in the interviews such as 'Valuing sources'. According to Savolainen interests determine the criteria for source and channel preferences through relevance; interests organise and focus a person's attention through the regions of relevance (Figure 41). The regions of relevance are reflected in the zones on an ISH map, and according to Savolainen (2008) a stable or general ISH captures how an individual values sources and channels and can provide insight into their preference across different situations. A more dynamic ISH map emerges when the focus is placed on specific interests or life projects. Here RQ2 is subsumed by RQ5, the ways in which sources are preferred are entwined with how sources are valued. Since interviews with international students focused on many interests, it is how sources and channels are valued that will be focused on.

The Master theme ‘Valuing sources’ emerged articulations of ISH maps, it captures super themes that relate to issues which were important for international students when selecting and preferring sources. Trust, feedback, contact and quality all emerged as important criteria when selecting a source. Preferring a source usually involved a process, when trust was an issue this might involve cross referencing multiple sources, or for quality a lengthy process of finding and comparing the information content of sources. These processes may occur during information seeking or at other times; an international student’s information environment was something that they managed and tended to during their everyday lives. The process of source selection was also more complex than simply picking a source. International students spoke of following sources of information, how they found new ones through recommendations and the preferences of other people. In a decision to select a source the quality of information will be weighted along with how it is valued, liked or disliked and for instance in the case of the theme ‘Personality’ attitude may determine which source is selected. Accounts of individuals associated with the theme ‘Valuing sources’ show how sharing a similar experience with another person and identifying with them is an important criterion for valuing a source. How a source is valued affects the ways in which it is preferred. In the theme of ‘Information seeking’ a participant’s account shows how experience has shaped their approach to trusting information sources when seeking information.

The intent of RQ3 is to place the phone in the information seeking practices of international students, and since ISH maps provide a picture of information sources in information seeking practices RQ3 and RQ4 will be addressed jointly. The phone in this context was appropriated for multiple functions that supported information seeking practices. The Master theme of ‘The mobile phone’ captures some of the ways in which it is important. Some accounts spoke of the phone as a source, where information was stored and accessed on the phone like a contact list, and others spoke of accessing sources like Facebook, blogs, or e-newsletters. The phone also offered multiple channels for information: written, oral, video, images all could be accessed through the phone. In this way phone was not per se an information source; it was a channel through which information could be communicated or be a mediator of information (Capurro & Hjørland, 2003).

In most cases the phone was described as completely affecting everything in an international student’s ISH. Phones were positioned as an extension – even an augmentation – enhancing an individual’s stock of knowledge. In one way or another most sources of information, at least

the most important, were accessed through the phone. It connected participants to networked and human sources, organisations, social and digital media, providing a stream of information about everyday life which they could dip into when required. Managing this information became important, as accounts under the theme of 'Information seeking' reveal. The theme of 'Experience' shows how phones also become status symbols.

The Master theme 'Information seeking' lists the information practices which emerged through the accounts of international students and the topics of importance. The information practices defined by Savolainen's (2008) model of information practices are the seeking, use and sharing of information. The model can describe most of the practices which emerged here, for instance staying up-to-date involves seeking information, information aggregation implies use and information sharing is clearly defined. One practice which stands out is information management, it involves active engagement by an individual with their information sources and channels; these are organised, and information may be stored for later use. Following the model this could be considered information use, a series of information practices (seeking and use) or a separate practice that involves its own information actions.

Issues like finding the wrong information, confirming information, verifying information and making decisions (selecting a source for instance) all played out in accounts of information seeking. They relate to how sources are valued, and thus selected in information seeking. Here criteria are applied in the process of seeking and not only in a positive or negative way – for instance good quality or poor quality, trusted or not trusted. A trusted source may be verified against another trusted source to avoid getting the wrong information or a trusted friend asked to confirm the quality of some information found on a networked source.

9.6. Summary

This part of Chapter 9 presents a summary of the chapter which has been presented in four parts. Part 9.2 presented the results of participant recruitment for the study. Part 9.3 presented the results from analysis of Information Source Horizon (ISH) maps generated by interview participants. Part 9.4 presented the results of Interpretative Phenomenological Analysis (IPA), describing twenty Master Themes which emerged from the process. Part 9.5 presents a discussion, bringing together ISH and IPA results to address the research aim and questions which guided the study.

10. Mixed method findings and interpretation

10.1. Introduction

This chapter presents the findings for the sequential emergent multiphase mixed methods study. The chapter is organised into three parts. Part two presents the research problem as an aim and the associated mixed methods research questions that guided the Phase One, Phase Two and Phase Three studies. Part three presents a summary of the mixed methods procedures and products for each of the three phases, and part four presents the mixed methods findings and interpretations through the lens of the mixed methods research questions and research problem.

- Part 10.2 presents the research problem and mixed methods research questions.
- Part 10.3 presents a summary of the multiphase research design.
- Part 10.4 presents the mixed method findings and interpretations.

10.2. The research problem and mixed methods aims

This part of Chapter 10 presents the research problem expressed as an aim for the thesis and the mixed methods research questions which guided the design of the Phase Two and Phase Three studies. Figure 45 presents the sequential emergent mixed methods research design followed by this thesis, updated with the mixed methods research questions.

The research problem expressed as an aim was: to understand the role of Information and Communication Technologies (ICTs) in the acculturation experience of an international student. In order to address the research problem, three separate studies (referred to as Phases) were conducted in a sequential design and emergent process illustrated by Figure 45. Phase One was designed to start an exploration of the research problem, the Phase Two study emerged from the results of Phase One guided by the mixed methods research question MM-RQ1, and the Phase Three study emerged from the results of Phase Two guided by the mixed methods research question MM-RQ2. For completeness, there is also a link between the Phase One and Phase Three studies which is reflected in the additional mixed methods research questions MM-RQ3. By addressing these research questions, the success of the studies for addressing the research problem may be evaluated, and the mixed methods findings generated.

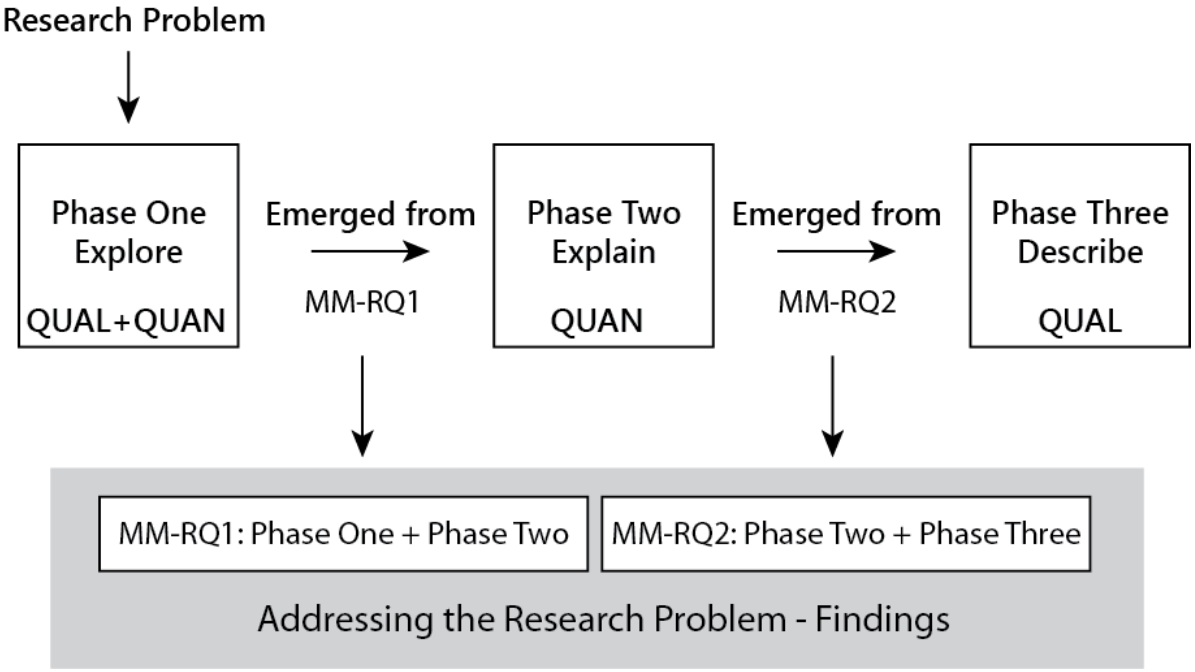


Figure 45: Updated sequential emergent mixed methods research design

The research questions are as follows:

MM-RQ1: *In what ways did the Phase Two study explain the Phase One study findings?*

MM-RQ2: *In what ways did the Phase Three study provide a better understanding of findings in the Phase Two study?*

MM-RQ3: *In what ways have the results from Phases One, Two and Three addressed the research problem?*

10.3. Multiphase summary

This part of Chapter 10 presents a summary of the procedures and products for each phase of the sequential emergent multiphase mixed methods design as procedural diagrams, as proposed by Creswell and Clark (2011) in three sections. The first section 10.3.1 presents the Phase One procedures and products, the second section 10.3.2 presents the Phase Two procedures and products and the third section 10.3.3 presents the Phase Three procedures and products.

10.3.1. Phase One procedures and products

This section presents a description of the Phase One study and interpretation of its results as they relate to the aims of the study. As stated previously in Chapter 4 the Phase One study aimed to explore the use of Information and Communication Technology (ICT) by international students in interactions with important people in their lives at different stages of their sojourn.

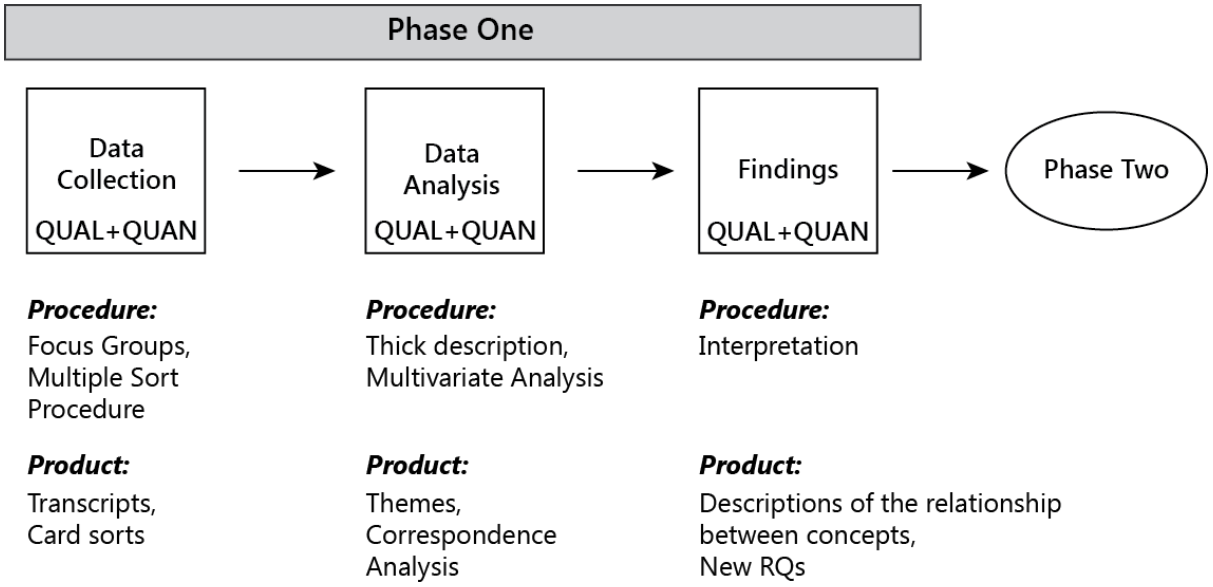


Figure 46: Diagram of the procedures and products of the Phase One mixed methods design

Through engagement with relevant literature a series of research questions (RQs) were devised to address the aim of the study. The study procedures and products for each stage are outlined in Figure 46. Both qualitative and quantitative data were collected using the Focus group technique and a Multiple Sort Procedure (MSP) to generate types of communication used by international students staying in Tasmania at three different stages in their sojourn (categories): those used at present (Here), those used at the time of arrival (Arrival) and those used at home (Home). The MSP procedure generated types of communication across three categories. The exercise was reflexive and international students were asked to explain why different types of communication were important to them. These procedures generated transcripts of focus group discussions and sort data (the types of communication and sort categories Here, Arrival, Home). Communication types and sort categories were analysed using multivariate techniques, and transcripts were used to generate a series of themes drawn

from the reflexive accounts of participants to explain the multivariate analysis. Results were a series of themes, communication types and Correspondence Analysis. Research questions were addressed through interpretation of these results on completion of the study presented in Chapter 5.

10.3.2. Phase Two procedures and products

This section presents a description of the Phase Two study and interpretation of its results as they relate to the aims of the study. As stated previously in Chapter 6 the Phase Two study aimed to investigate the relationship between mobile phone use and related variables within a sample of international students staying in Tasmania. The study's aim was formulated to provide explanation of results obtained in the Phase One study, where technology use for communication was reported to change during the sojourn but the phone was consistently important at each stage of the sojourn.

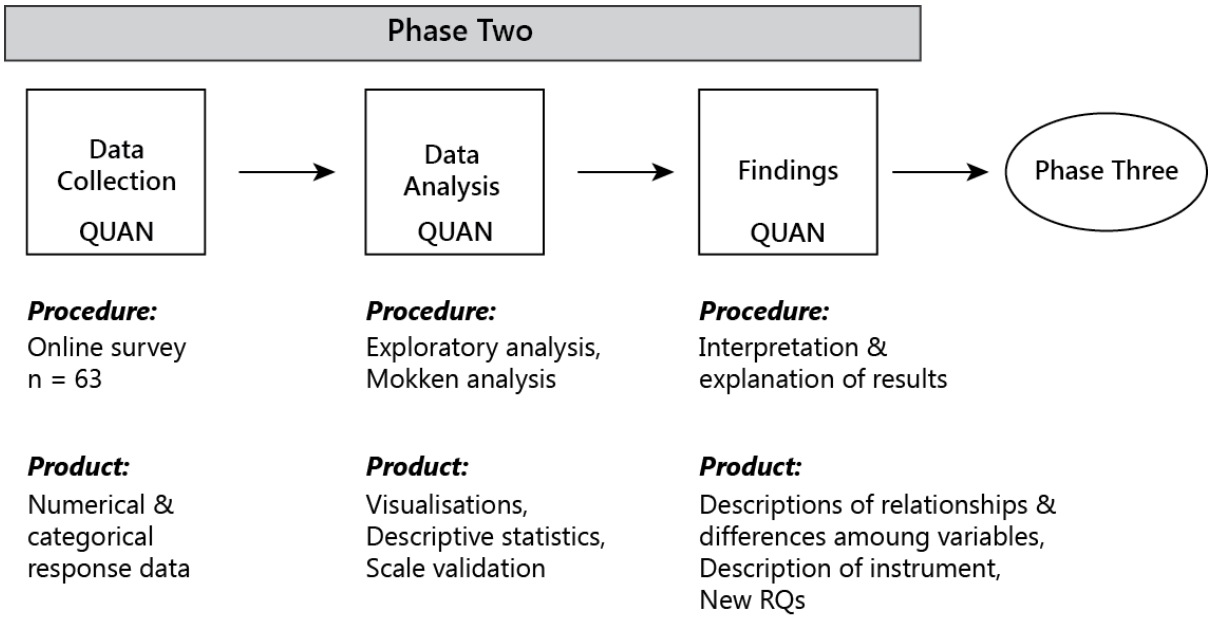


Figure 47: Diagram of the procedures and products of the Phase Two mixed methods design

Building on the Phase One study and through engagement with relevant literature a series of research questions (RQs) were devised to address the aim of the study. The study procedure and products for each stage are outlined in Figure 47. Quantitative data were collected using

an online survey questionnaire with a series of 36 questions covering five topic areas. The survey generated numeric and categorical response data from survey participants. Response data were analysed using descriptive and exploratory analytical techniques, Mokken scale analysis and Spearman's Rank correlation coefficient. Analysis procedures produced descriptive statistics, data visualisations, scale analysis and correlation coefficients between variables. Research questions were addressed through interpretation of these results upon completion of the study that is presented in Chapter 7.

10.3.3. Phase Three procedures and products

This section presents a description of the Phase Three study and summary of its results as they relate to the aims of the study. As stated previously in Chapter 8 the Phase Three study aimed to understand the role of the mobile phone in an international student's Everyday Life Information Seeking (ELIS) as a particular case of ICT in an international student's everyday life. The study's aim was formulated to provide a more detailed understanding of results obtained in Phase One and Phase Two.

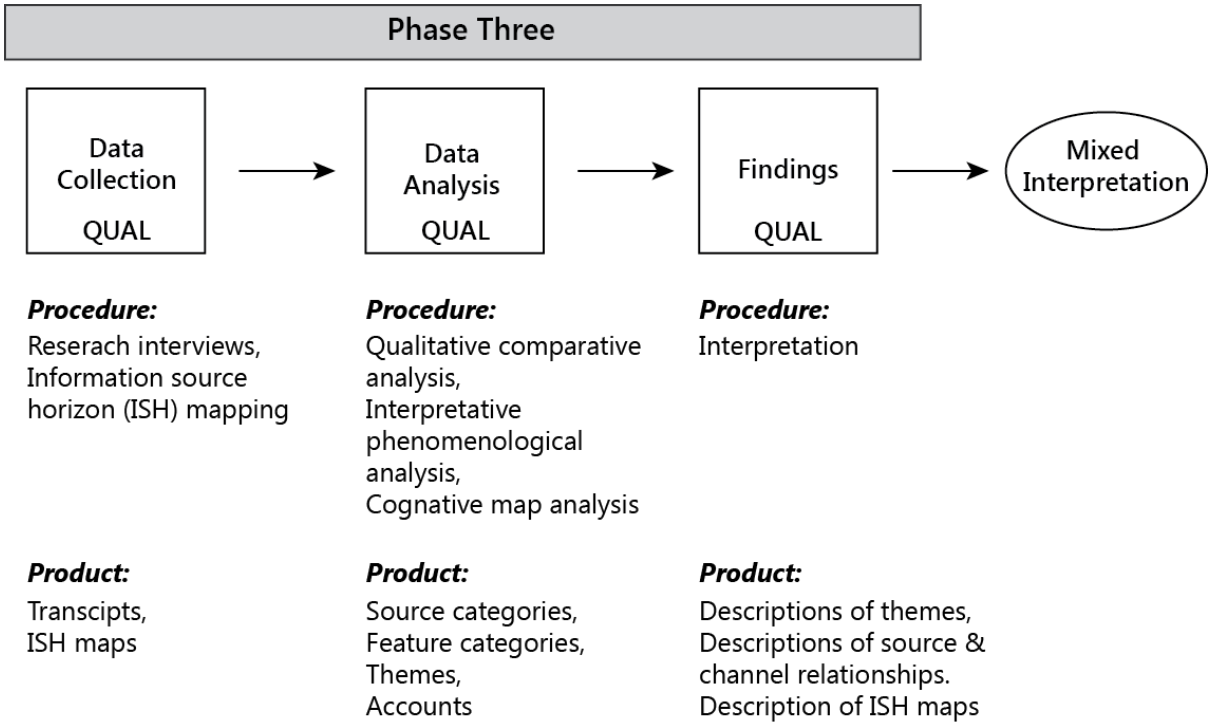


Figure 48: Diagram of the procedures and products of the Phase Three mixed methods design

Building on the Phase Two study and through engagement with relevant literature a series of research questions (RQs) were devised to address the aim of this study. Procedures and products for each stage of this study are listed in Figure 48. Qualitative data were collected using the semi-structured research interview technique with an Information Sources Horizon (ISH) mapping exercise. Interview transcripts were analysed using Interpretative Phenomenological Analysis (IPA), while ISH maps were analysed using Qualitative Content Analysis (QCA) and cognitive map analysis techniques. IPA analysis resulted in a series of themes relating to everyday life staying in Tasmania and the experience of seeking information. QCA analysis of ISH maps generated cognitive map categories for organising ISH map concepts, and cognitive map analysis resulted in map feature categories for organising map features. The RQs were addressed through interpretation of these results upon completion of the study, this is presented in Chapter 9.

10.4. Mixed methods findings and interpretation

This part of Chapter 10 presents interpretation and findings as they relate to the Mixed Methods Research Questions MM-RQ1 – 3 in three sections. Section 10.4.1 presents a comparison of findings and results from Phase One and Phase Two to address MM-RQ1. Section 10.4.2 presents a comparison of findings and results from Phase Two and Phase Three to address MM-RQ2, and section 10.4.3 presents a comparison of findings and results from Phase Three and Phase One to address MM-RQ3.

10.4.1. Comparison of Phase One and Phase Two

This section presents a comparison of the relationship between findings that emerged from the Phase One and Phase Two studies to address the mixed methods research questions:

> **MM-RQ1:** *In what ways did the Phase Two study explain the Phase One study findings?*

Results from the Phase One study revealed that the ICT appropriated for communication by an international student changed during different stages of their sojourn experience. Results highlighted that the ICTs used changed, as did how they were used. The accounts of international students highlighted that use of the mobile phone which travelled with them changed in response to their new life circumstance. Results from the Phase Two study provide support for the process of ICT change observed in results from the Phase One study.

The Phase Two study result showed a strong relationship between the time spent living in Tasmania and the length of time that an international student had owned their current phone. In the Phase One study results showed that ICTs used for communication changed most significantly on arrival in Tasmania where the range of ICTs used and the ways in which they were used expanded significantly. Later on it had stabilised and was more consistent. The phone travelled with them, and it supported the adoption and appropriation of new forms of ICTs encountered, and provided consistency for practices of communication in everyday life during the sojourn.

> *These results provided evidence to support the finding that the use of ICTs by an international student changes in response to the sojourn experience.*

That ICT changes in the lives of migrants between home and host countries is supported by literature on ICT change (Codagnone & Kluzer, 2011; Elgahwash & Freeman, 2011). To expand on this finding the Phase One study conceptualised the sojourn experience in three stages: Here, Arrival and Home. The concept arose from the process of settlement and information needs described by Mwarigha (2004), and the dichotomy between 'here' and 'home' which arises in the accounts of migrants (Collins, 2009) and the concept of a journey in distinct stages (Collins, 2008). Collins (2008, p. 405) describes the stages of this journey as: 'the pathways that students take to come to [the host city], their everyday lives while residing in the [host city]. And the process of return to [their home country]'.

The sojourn or journey described in the Phase One study are: Here, the experience of everyday life in the host country (long term); Arrival, the experience of arrival (short term), and Home, everyday life in the home country (pre-sojourn). In this way the sojourn experience of an international student may be conceptualised in three significant stages. But the process may also be generalised, the meaning of Here and Home may change if an international student considers life in their host country to be 'home' and home country to be 'here'. This change may occur as the result of settling in, or adaptation resulting from acculturation. In this way the sojourn experience is a cyclical concept and Figure 49 presents a diagram illustrating the concept of the sojourn experience for each stage of the journey. This conceptualisation of the sojourn experience is cyclical to reflect that an international student will temporarily stay in a host country, and at various times return home. They will go through an arrival experience each time they enter a host or home country depending on

which they consider to be ‘home’. For those individuals who travel frequently between home and host countries this distinction may blur and if you positioned their experience in the diagram it sits between Home and Here, and far away from Arrival as that experience would no longer be considered important.

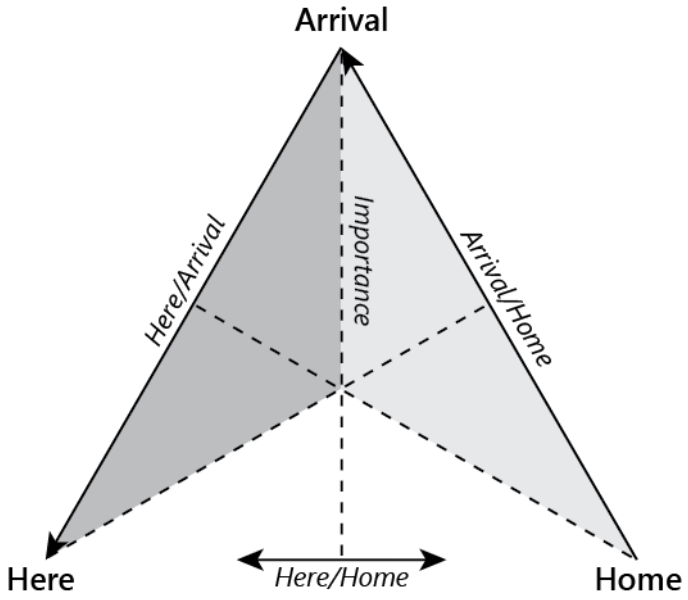


Figure 49: Model of the association between three stages in the sojourn experience

In the Phase One study results showed that ICT change was related to significant stages in the sojourn experience, which was supported by results from the Phase Two study. If an individual’s sojourn experience may be positioned in the diagram presented by Figure 49 then so too can ICTs associated with the experience. The Phase One study recorded the frequency with which ICTs (and other concepts relating to communication) were mentioned by international students in association with each of the three stages. Correspondence Analysis between the stages of the journey (categories) and the frequency of ICTs mentioned in each category showed an association and a spatial arrangement which supports this arrangement. The importance was determined by frequency, the frequency that an ICT is mentioned in association with a stage in the journey.

On the diagram an ICT would be placed closer to a stage where it was mentioned most frequently, representing the strength of that association. At an individual level results showed that variance was greater because the perceived importance of different stages and thus ICTs varied between individuals, but across a group a clear pattern of association emerged. In this way it could be anticipated that for an international student reporting their experience of arriving in a host country for the first time, ICTs that were important to them would be placed closest to Arrival and Home on the diagram. An example is needing to use Skype to contact family on arrival. Later on, important ICTs would be placed between Arrival and Here or Here and Home. An example might be a change from Skype to Viber which would appear closer to Here or if Skype was still in use it would appear between Arrival and Here. It was observed in the Phase One study that the phone was positioned closer to the centre of the diagram. This makes sense as the phone travels with an international student and does not change, it therefore is associated with each stage and will appear closer to the centre.

The statement that ICT changes while on sojourn is supported by existing scholarship which shows that social, economic, cultural and other differences between host and home countries can cause change. When an important kind of ICT is identified in this way, models of ICT adoption and appropriation can be applied to help understand or explain the change at an individual level by revealing the relevant factors involved. The model presented here helps to position ICTs and other concepts associated with the sojourn experience in relation to one another based on their perceived importance.

10.4.2. Comparison of Phase Two and Phase Three findings

This section presents a comparison of the relationship between findings that emerged from the Phase Two study and Phase Three study to address the mixed methods research question:

> **MM-RQ2:** *In what ways did the Phase Three study provide a better understanding of findings in the Phase Two study?*

Results from the Phase Two study highlighted the importance of a mobile phone to the everyday life of an international student. They showed that the phone was used to find different kinds of information across the international students surveyed. A strong relationship was observed between phone use, the length of time owning a phone and use of the phone to find information. To illustrate the relationships between these variables a

diagram of the relationships that were observed between variables in the Phase Two study is presented in Figure 50. Building on these results the Phase Three study was designed to provide a deeper understanding of the role that a phone played in an international student's everyday life while staying in Tasmania. Prompted by the result that phones were important for finding information, the study focused on everyday information practices. That information is important in the everyday life of migrants, like international students, is supported by scholarship on social inclusion and the settlement process experienced by migrant groups (Caidi & Allard, 2005; Mwarigha, 2004).

Results from the Phase Three study supported the relationship between mobile phone use and finding information observed in the Phase Two study. When asked about the place of a phone in their information seeking they consistently reported that the phone was 'central' and covered 'everything' when it came to the sources and channels of information drawn on in information seeking practices. Results also showed that the phone was more than a source or channel of information. The phone acted as a channel through which information could be accessed, and a source where information was stored, organised and managed. It mediated other information sources and channels, providing an international student with the ability to access the internet, or to contact a friend when they needed. This meant that the phone was associated with many information practices, which along with seeking included sharing and use.

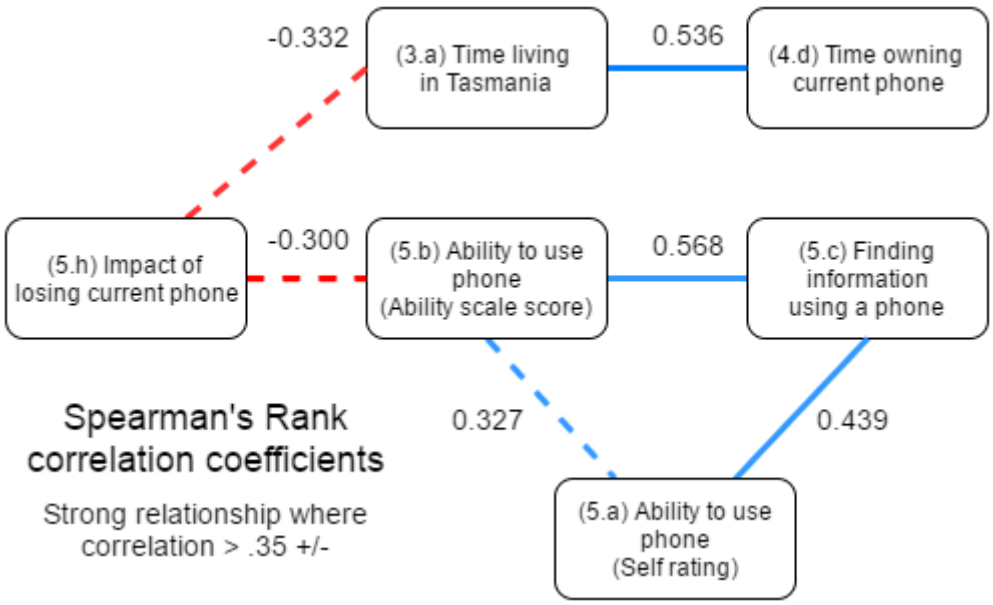


Figure 50: Significant relationships emerging from the Phase Two study

Two strong relationships emerged in the Phase Two study, the first between the length of time that an international student reported living in Tasmania and the length of time that a current mobile phone had been owned. The second between an international student's capability to use their mobile phone and their use of it for finding differed kinds of information. These two results are not related, suggesting that an international student's ability to use their mobile phone exists independently from their time spent living in Tasmania, it also suggests that an international student will have experience using a mobile phone before arriving in Tasmania and that they are likely to acquire a new phone on arrival. Both time spent living in Tasmania and ability to use a mobile phone have a weak negative relationship with the perceived impact of losing a mobile phone. This suggests that the impact of losing a mobile phone is greatest on arrival in Tasmania, interestingly it also suggests that losing a mobile phone would be less of an issue for an international student with greater ability to use their mobile phone.

Results from the Phase Three study help interpret these findings. Accounts of international students showed that having a phone let them prepare for activities such as travel in advance, by seeking and storing information which they anticipated a need for later on. In this way having a mobile phone at hand was very important, and this changed what is immediately relevant or accessible to an international student in their everyday life. A mobile phone reduces the immediacy of information needs, for instance when an international student arrives in Tasmania for the first time they can be carrying the necessary information with them to locate their accommodation or a place to go shopping, or even contact their family. An international student's ability to use a phone is then important for more than just finding information when a need arises, it allows them to be prepared for new and unfamiliar circumstances which they may encounter in the foreseeable future.

> *The evidence provided here supports the finding that having a phone changes the objects, (for instance information sources) that are relevant to an individual and hence their information practices, by giving them enhanced capabilities to act.*

This finding is supported by comments made by Savolainen (2008). When reflecting on the regions of relevance used to construct an Information Source Horizon (ISH), they observed

that the presence of ICT in everyday life may have had an effect on the 'World within potential reach'. With the development of technology, particularly ICTs, 'the world within potential reach tends to be broadened, and thus, one's dependence on an immediately available physical and cultural environment constitutive of world within actual research diminishes' (Savolainen, 2008, p. 59). That the mobile phone changes how an individual and their activities relate to space and time is also supported by scholarship on human migration (Diminescu, 2008).

10.4.3. Addressing the research problem

This section presents a comparison between Phase One, Phase Two and Phase Three studies to address the research problem and describe the findings which emerge. Here the mixed methods research question to be addressed is:

> **MM-RQ3:** *In what ways have the results from Phases One, Two and Three addressed the research problem?*
>
> **Research problem:** *To understand the role of Information and Communication Technologies (ICTs) in the acculturation experience of an international student.*

The multidimensional conceptualisation of acculturation as an 'interactive, developmental, multifactorial, and multidimensional process' (Cabassa, 2003, p. 128) is essential for understanding the role of ICTs in the adjustment process. Existing ICT scholarship provides links between the adoption and/or appropriation of ICTs to cultural change. Models of appropriation (DeSanctis & Poole, 1994) and adoption (Srite & Karahanna, 2006) include culture as a factor in these processes. Studies of the cultural appropriation of ICTs across transnational sites in trans-local contexts (Lindtner, Anderson, & Dourish, 2012), and the appropriation of mobile phones by migrants in Spain (Gordano, 2013), highlight the relationship between culture and ICT change. In social inclusion and exclusion scholarship the appropriation of ICTs by migrants is considered an important factor leading to settlement outcomes like integration, social cohesion and their ability to participant in a host society (Codagnone & Kluzer, 2011).

While the three studies undertaken for this thesis did not examine cultural psychological change experienced by international students, changes in ICTs used and their use in everyday

life practices during sojourn in Tasmania were observed. The Phase One study showed that the sojourn experience had an influence on the ICTs adopted and appropriated for communication practices; Phase Two showed that new phones were purchased on arrival in Tasmania, and Phase Three showed that phones and a host of other ICTs were adopted or appropriated in new ways in practices of information seeking. Scholarship supports the observation that life changes, new circumstances and experiences reshape an individual's techno-scape (Licoppe, 2004).

But not all ICTs changed. Results from Phase Two highlighted that while an international student may acquire a new mobile phone on arrival in a host country, it is in addition to their existing one. This allows them to have a functioning phone in both countries, and it means that associated practices of communication and information seeking likely travel with them. By remaining 'connected' to their host country the phone and other ICTs allow an individual to act in multiple locations. According to Collins (2009) separation between 'home' and 'here' manifests practices to reconnect through engagement with objects like 'food and photographs, encounters with familiar bodies and language' (p. 840). Through an investigation of international student communication practices, Collins finds that the internet mediates their everyday lives and shrinks the distance between 'home' and 'here' by supporting these practices. They also find that the constant connection can be problematic – by bringing 'home' closer to 'here' the opportunities and constraints, like cultural barriers, come too (Collins, 2009).

It can be argued that what Collins (2009) observes is a reaction to acculturation, and resistance to cultural adaptation supported by the internet. In a similar manner results from the Phase One and Phase Three studies show that the relationships and interests of international students staying in Tasmania were maintained. But in this case communication and information practices were enacted through the phone, which provided access to the internet, Skype and Facebook throughout the sojourn experience. These results indicate that the presence of a phone in the lives of international students will have an influence on contextual factors during the acculturation experience. For example, drawing on the model of an international student's sojourn experience proposed in section 10.4.1 and contextual factors proposed by Cabassa (2003), an international student with internet access and a phone at 'home' could explore their host society, establish contacts and make friends prior to departure. On 'arrival' having a phone allows them to remain in touch with their social

network and maintain this connection with ‘home’ while ‘here’. But having a phone or access to the internet does not constitute a contextual factor. Rather a phone will likely mediate the effects of contextual factors at an individual, situational and societal level on the acculturation experience.

It has been presented in Section 10.4.2 that having a phone changes what is relevant to an international student by giving them enhanced capabilities to act. In this way the phone also changes the relevance of contextual factors during the acculturation experience. Having a mobile phone mediates the issues and interests that are important to an international student, and thus mediate the effects of contextual factors (Cabassa, 2003) or variables at the individual, situational or societal level (Ward et al., 2001). At an individual level a phone may mediate the effects of language fluency on acculturation by providing access to an application that helps with translation, that supports the learning of language. At a situational level a phone may mediate the effects of a variable like access to social support, by providing access to social media in both home and host countries. At a societal level a phone may mediate a variable like the economic environment through the capabilities that it provides and in this way not having a phone may also cause exclusion. The role of ICTs as mediating factors is presented here in an updated diagram (Figure 51) of the acculturation process proposed by Ward et al. (2001), using the adapted version of the model presented by Zhou et al. (2008).

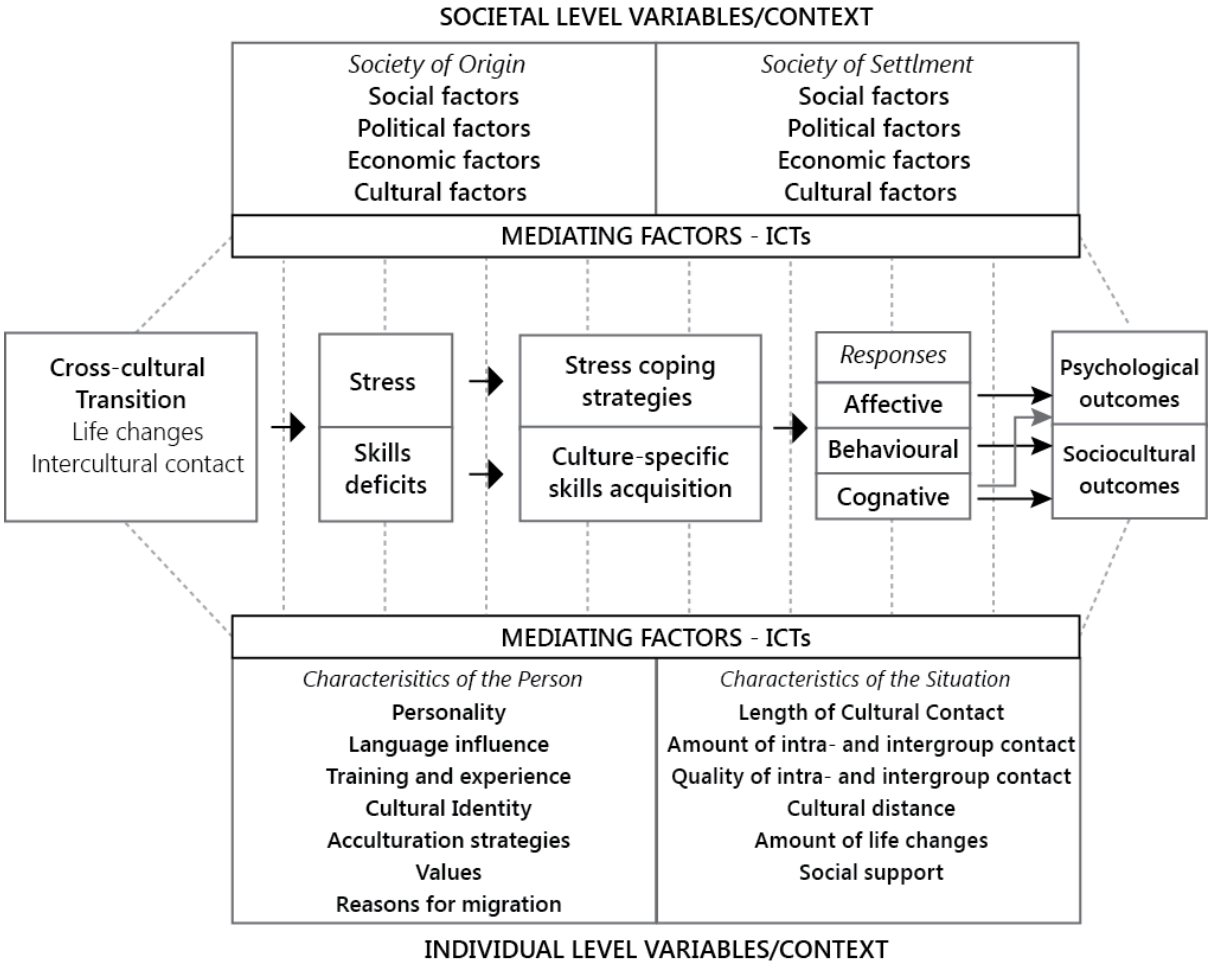


Figure 51: Updated model of the acculturation process with mediating factors

Figure 51 illustrates the mediating factors like ICTs (there are potentially others) will interact with variables at multiple levels, and their effects at different stages in the acculturation process. Drawing on this model it is possible to see how, for example, access to social support that depended on having a phone could influence the acculturation process. Not having a phone could lead to exacerbated stress, manifest in unusual coping strategies in a range of responses and outcomes. Conversely the phone may help with skills deficits and cultural specific skills acquisition by providing opportunities for learning cultural skills and also cultural contact even before arriving in a host country.

> *This evidence supports the finding that having a phone mediates contextual factors in the acculturation experience of an international student.*

This finding demonstrates that a practice approach towards acculturation allows the role of humans and non-humans (like a phone) to be considered in the acculturation process. If social order is established through a nexus of practices then change may be observed through changing practices (Schatzki, 2005a). A practice approach towards acculturation supports an understanding of the phone and other ICTs in the acculturation experience and the adjustment process.

It is known that ICTs mediate many aspects of everyday life. Studies in the field of Computer Mediated Communication (CMC) have identified that mobile phones are a kind of polymedia – providing an environment of communication and media where an individual can remain connected. But when everyone has a phone (or two or more) new issues arise, such as the expectation that a person will remain connected and will always be available (Madianou, 2014). For an international student this may create issues when communicating with friends or family members back home. Some of these people may not use their phone to the same extent or have the same level of capability. Results show that while access to a phone may not be an issue, reliance on the phone, expectations and capability – both the individual's to make use of a device's functionality and the capability of the device itself in the case of a normal vs smart phone – are likely important issues that may affect the adjustment of an international student.

> *This evidence supports the finding that mobile phone capability is an important, having a phone provides consistency and continuity for everyday practices between home and here.*

A lack of personal ability or device functionality may make operating socially, economically or otherwise difficult in a host society, particularly where there are expectations about phone capabilities. Or a lack of capability could make certain communication or information practices different, affecting an international student's adjustment to their new life circumstance.

10.5. Summary

This part of Chapter 10 presents a summary of the chapter. The chapter has presented the findings and interpretation for this thesis in three main parts. Part 10.2 presented the research problem and mixed methods research questions which guide the findings and interpretations. Part 10.3 presented a summary of the multiphase research approach adopted by this thesis along with the procedures and products of the Phase One, Phase Two and Three studies. Part 10.4 presented the mixed methods research findings and interpretations following the mixed methods research questions to address the research problem.

11. Conclusions

11.1. Introduction

This chapter presents the conclusions for this thesis in five parts. Part two presents a summary of the key findings emerging from the mixed methods research. Part three presents the significant contributions that this thesis makes to scholarship at a substantive, methodological and theoretical level. Part four presents the approach taken towards validity and reliability in this thesis. Part five presents the limitations of this thesis and part six presents opportunities for future work.

- Part 11.2 presents a summary of the mixed methods research findings.
- Part 11.3 presents a description of the significant contributions made by this thesis to scholarship at the substantive, methodological and theoretical levels.
- Part 11.4 presents the approach taken towards validity and reliability in this thesis.
- Part 11.5 presents the limitations of this thesis.
- Part 11.6 presents the opportunities for future work emerging from this thesis.

11.2. Summary of findings

This part of Chapter 11 presents a summary of the findings described in Chapter 10: Interpretations and Findings emerging from the results of the Phase One, Two and Three studies. Results from the three studies undertaken for sequential emergent multiphase mixed methods research conducted for this thesis provide a means of understanding the role of ICTs in the acculturation experience of an international student. The Phase One study (Chapter 4 and 5) was able to explore the extent of ICT use in communication practices during three different stages of an international student's sojourn. The Phase Two study (Chapter 6 and 7) provides broader picture of phone use and ownership by international students living in Tasmania and the Phase Three study (Chapter 8 and 9) provides an in-depth understanding of the phone in the everyday information practices of an international student.

The evidence presented in this thesis supports the finding that the sojourn experience of an international student is related to change in the ICTs which they use and how they are used. For an international student embarking on sojourn their experience may be understood in three significant stages. The lead up to departing their home country, 'Home', arriving in the

host country, ‘Arrival’, and their everyday experience in the short and long term, ‘Here’. Their experience of these different stages is related to the change in ICTs through a conceptual model which allows for the importance of ICT to be evaluated against others and the different stages of the sojourn. The model supports the cyclical nature of the sojourn experience characterised by trips between Home and Here and may be expanded to include other concepts relating to the significant stage which it identifies.

The model helps explain why new ICTs may be adopted, or existing ones appropriated in new ways, in response to changes in life circumstances while on sojourn. An international student may adopt new kinds of media – for instance because the availability of services changes between home and host countries or to communicate with people they meet along the way. How they use existing services may also change; to maintain contact with people in their home country an ICT may be used in new ways, for instance by taking advantage of multiple media such as text, voice, and images to communicate where previously only text was necessary.

For the international students who participated in the three studies the mobile phone travelled with them to Tasmania. Having it with them provided consistency to their everyday lives and continuity to their everyday information and communication practices across the different stages of their sojourn experience. Normally new life circumstances may be understood to mean that established habits of information seeking or communication need to change or, new habits be established, in order for an international student to adapt to their new circumstance. But for international students who carry the phone with them, the phone mediates these changing life circumstances. Having a phone alters the things – the people, information, communication or everyday issues and interests – that are important and relevant to everyday life by giving a person enhanced capabilities to act while on sojourn. At arrival many international students will also acquire a new phone, in addition to their existing device – allowing them to operate between home and host countries. Having this capability means that an international student arriving with a phone no longer needs to find a fixed line phone to call home, or even have the internet available in their residence. Contacts, plans, information and communication travel with them through the device, as do their capabilities to perform everyday practices.

In this way having a phone also mediates the acculturation experience for an international student. An international student's life circumstances do change, and the processes of acculturation (Ward et al., 2001) and settlement (Mwarigha, 2004) take place, but the experience of these processes and of adjustment during the sojourn is altered. The issues which previously may have mattered, such as the need to re-establish social networks, renew social capital (Neri & Ville, 2008) or participate socially and culturally in a host society (Collins, 2009) are diminished by having a phone. The phone allows an international student to remain connected (Diminescu, 2008) and bridge the gap between 'home' and 'here' (Collins, 2009; Licoppe, 2004). The phone creates new challenges when access is no longer an issue – expectations of use and capabilities take its place. It provides opportunities to engage international students and help them integrate into the host society (Rissola, 2013), but also reinforces existing social and cultural barriers from 'home' and reduces the perceived need for social and cultural participation 'here', both of which increase the social and cultural distance in acculturation. International students who participated in the three studies spoke of their interest in making new friends, and engaging socially and culturally in Tasmanian society, but not of a need or priority to do so. To them it was a nice idea and an interest which they would pursue if there was time outside of work, study and the requirements of everyday life. This is not to say that great social or cultural divides were encountered but rather that they were not, to the extent that differences or potential difficulties were taken for granted. This experience may also be attributed to the connection provided by ICTs, supported by the internet, which allowed an international student to view or hear about life in a host country before their arrival. They are even able to meet people and make friends in a host country prior to leaving home.

11.3. The significance of research findings to scholarship

This part of Chapter 11 presents the significance of research findings to scholarship, how the thesis makes contributions at a substantive, methodological and theoretical level.

At a substantive level, this thesis provides an understand of the mediating role that Information and Communication Technology (ICT) has in the acculturation experience of an international student. This contribution is achieved through the application of a mixed methods approach which provided three distinct views of the phone: its role in communication practices during three stages of the sojourn; the use and ownership of phones generally, and the role of the phone in everyday information practices. The substantive

contribution of this thesis has been to provide a unique socio-cultural perspective of the phone and its role in the acculturation experience of an international student through an understanding of their communication and information practices. As the research was undertaken in Tasmania, and engaged international students studying at the University of Tasmania, it also provides a unique understanding of the acculturation experience of international students in this specific cultural context.

At a methodological level the thesis makes three contributions which emerge from the sequential emergent multi-phase mixed methods design followed to address the research problem. The three contributions are as follows:

- The Phase One study contributes a methodological approach for evaluating the relevance of concepts (in the case of this thesis ICTs) to an international student's sojourn experience.
- The Phase Two study developed and evaluated a scale instrument for measuring a person's perceived capability to use their mobile phone.
- The Phase Three study contributes an evaluation of the methodological approach used by Savolainen (2008) for understanding everyday information practices; it provides support for the Information Source Horizon (ISH) approach and it identifies a key limitation of the underlying model.

The Phase One study presented in Chapters 4 and 5 was designed to explore the research problem. It involved focus group interviews with international students. Focus groups followed a Multiple Sorting Procedure to generate concepts about communication practices across three stages of the sojourn experience and support a reflexive approach to data collection with participant involvement. This generated rich qualitative data, including the accounts of international students, along with concepts and categories generated through the multiple sort procedure. The categories and concepts were analysed using Correspondence Analysis to provide a mixed set of results exploring the relationship among concepts and stages in the sojourn experience interpreted alongside the accounts of focus group participants. In this way the study contributes an approach towards evaluating the relationship between the sojourn experience and the importance (or relevance) of ICTs.

The Phase Two study presented in Chapters 6 and 7 was designed to explain key results from the Phase One study. The study involved an online questionnaire administered to a sample of the international student population staying in Tasmania, which turned out to resemble the population on a few demographic characteristics. The questionnaire was designed to understand the relationships among variables, including demographics, travel, living arrangements, ICT ownership and mobile phone use. As part of the questionnaire an eight item scale instrument was developed to measure a respondent's mobile phone capability, and results from the survey allowed the scale to be evaluated and its validity confirmed. The scale provides a valid means of measuring an individual's phone capabilities and could easily be expanded to measure other ICT capabilities as well.

The Phase Three study presented in Chapter 8 and 9 was designed to better understand results from the Phase Two study in more detail. It drew on in-depth interviews with a diverse range of international students staying in Tasmania to hear accounts of their information practices and everyday life experience. Interviews included an Information Source Horizon (ISH) mapping think aloud exercise to understand the role of their mobile phone when seeking information. Results from the study contribute to an evaluation of concepts in the model of Everyday Information Practices (Savolainen, 2008) and provide support for the ISH technique used to understanding them. The Phase Three study also confirms an observation made by Savolainen (2008) that ICTs are changing what is perceived to be important in a person's life world. This has implications for the usefulness of concepts of the life world developed by Schutz and Luckmann (1974), specifically the use of regions of relevance to understand relevance in the context of a person's life world.

At a theoretical level this thesis provides a greater understanding of the acculturation experience of an international student by making two significant contributions. The first contribution is an abstract model of an international student's sojourn experience. The model presents the sojourn experience as a cyclical process in three significant stages; it describes the relationship between stages in the sojourn experience and changes in the perceived (and potentially actual) relevance of 'things' to an international student. For instance, it can describe the relationship between the sojourn experience, change in ICT use and contextual factors like the duration of a sojourn. The model supports comparisons of the sojourn experience between individuals and groups over time. The second contribution is an understanding of the mediating role which a mobile phone plays in the acculturation

experience of an international student. Evidence presented in Chapter 10 indicates that the phone and potentially other ICTs mediate the effects of contextual factors on the acculturation experience of an international student. This evidence is used to update an existing model of the acculturation process presented by (Ward et al., 2001) to accommodate mediating factors and account for the effect which they can have on contextual factors and variables at multiple levels. This adapted model will allow for the effects of mediating factors to be considered in the acculturation process and support investigation of the multidimensionality of the concept beyond the domain of cultural psychological research.

11.4. Approaching quality in mixed methods research

This part of Chapter 11 presents the concepts of validity and reliability along with the strategies and procedures adopted by this thesis. For research to have integrity it must be open to critique and evaluation. In order for others to assess the worth of a study it is important that the standards and criteria that warrant confidence in a study's methods, findings, assumptions and conclusions are clearly presented.

Traditionally this assessment centres on whether the research is able to demonstrate validity and reliability, but the definition of these concepts and the relevant procedures to follow will vary depending on the philosophical perspective from which the research is viewed. From philosophical assumptions such as those inherent in research paradigms, arise the guidelines, criteria, and processes for warranting claims about truth and knowledge (Greene, 2007, p. 165).

Broadly how validity and reliability are defined will depend on whether research is viewed from a qualitative or quantitative perspective. Here the meaning of quantitative research is 'research that explains phenomena according to numerical data which are analysed by means of mathematically based methods' (Yilmaz, 2013, p. 311). The meaning of qualitative research is 'an emergent, inductive, interpretive, and naturalistic approach to the study of people, cases, phenomena, social situations and processes in their natural settings in order to reveal in descriptive terms the meaning that people attach to their experiences of the world' (Yilmaz, 2013, p. 312).

To expand on the concepts of validity and reliability section 11.4.1 presents a quantitative perspective, and section 11.4.2 presents a qualitative perspective. Section 11.4.3 presents the

strategies and procedures undertaken by this thesis to demonstrate validity and reliability and the mixed methods approach.

11.4.1. A quantitative perspective on validity and reliability

This section presents a quantitative perspective on validity and reliability. For quantitative research reliability is understood to mean 'the degree to which a research instrument measures a given [construct] consistently every time it is used under the same conditions with the same subjects' (Yilmaz, 2013, p. 317). How reliability is measured will depend on the kind of instrument, but generally reliability will focus on internal and external consistency. Yilmaz (2013, p. 318) lists four kinds of reliability which a researcher may address:

- *Test-retest reliability* refers to the extent that the same test administered by the researcher to a single group of subjects on two different occasions gives highly positively correlated results.
- *Parallel form reliability* demonstrates whether two form of the same instrument administered to the same group of people to measure the same characteristic […] give highly positively correlated results
- *Internal consistency reliability* indicates whether measuring instruments possess internal consistency or the results of the instrument administered to a group of people on one occasion correlate very positively.
- *Inter-rater (Inter-observer) reliability* refers to the process whereby the research gathers data by asking ratters to evaluate a set of objects, pictures etc., and then quantify the degree of consistency among the rates.

However, an instrument can be reliable without being valid. Validity is the extent to which the interpretations of the results of an instrument are warranted - with respect to its intended use. Reliability may be treated as one form of evidence in support of an instrument's validity.

Stability indicates reliability and repeatable results are the most reliable. But this test-retest method is itself subject to extraneous influences, an instrument will only measure certain characteristics of a respondent and changes in other characteristics like attitudes may lead to difference in the responses provided. Thus even if an instrument is reliable it may not be valid (Golafshani, 2003).

The concept of validity refers to the accuracy of research data which is determined by 'the extent to which an instrument measures what is purports to measure' (Kimberlin & Winterstein, 2008, p. 2278). Measurement of a construct requires that a conceptual definition is translated into an operation definition linked to indicators where numbers can be applied (Yilmaz, 2013).

Validity can generally be separated into three kinds; content, criterion and construct validity. Content validity addresses how well the items an instruments item(s) operationalise a construct, and criterion validity addresses how well scores on a measure correlate with other measure of the same construct or similar underlying constructs that theoretically should be related. Since both the concepts are related to the construct, they are often organised under the overarching framework of construct validity (Cook & Beckman, 2006).

The definition for construct validity is then the extent to which an instrument measures the construct which it was intended to measure. Testing construct validity involves evaluation of the relationship between a measure and a construct by gathering several different kinds of evidence, and accumulating them over time (Kimberlin & Winterstein, 2008). The different kinds of evidence which may be collected to support construct validity include content, response process, internal structure, relations to other variables (criterion) and consequences (Cook & Beckman, 2006).

Method bias

A relevant concept to address when establishing validity and reliability in quantitative research is method bias. The term 'method' refers to aspects of the measurement process and 'bias' refers to variance in the response tendencies of respondents across measures (Podsakoff, MacKenzie, & Podsakoff, 2012).

Variance (or error) is attributed to a variety of sources which include 'respondent response styles, item characteristics, and aspects of the measurement context to be 'method' factors' (Podsakoff et al., 2012, p. 542). These factors can influence construct validity and reliability by obscuring relationships between constructs (latent traits) and biasing estimates of those constructs. Method bias does not affect all methods equally, and there are situations where a certain kind of bias is more relevant than another, varying by discipline, research context or the kind of construct being measured (Podsakoff et al., 2012, p. 880).

Different kinds of method bias may arise dependant on a range of factors including whether a measure is obtained from the same or a different source. The response styles of participants such as acquiescence, dis-acquiescence, extreme, midpoint, and non-contingent styles which may cause variance across different types of constructs. The proximity and order of items presented by the instrument and an item's wording and the item's context or how it is presented, for instance in a positive or negative way (Podsakoff et al., 2012).

11.4.2. A qualitative perspective on validity and reliability

This section presents a qualitative perspective on validity and reliability. In quantitative research validity and reliability are related to instrument construction, in qualitative research validity and reliability will also depend on the ability and effort of the researcher who is instrumental in the research process and may involve readers and research participants to varying degrees. For this reason, it is not uncommon for a qualitative researcher to replace the quantitative concepts of validity and reliability in favour of concepts sensitive to the qualitative tradition. The concept of validity may be replaced with trustworthiness, credibility and authenticity which account for the standpoints of participants and readers along with the researchers in the evaluation of a study. The concept of reliability may be replaced with those of dependability and auditability which account for the consistency of the study process over time, between research, methods or projects (Yilmaz, 2013). Here the process of evaluating the validity and reliability of a qualitative study will be referred to as assessing its quality.

However, while the criteria for addressing validity and reliability are expanded or altered in qualitative research the definition of these concepts remains largely the same as those used by quantitative research (Long & Johnson, 2000). The main difference between qualitative and quantitative research is the kinds of procedures or strategies which may be employed to address the quality of a study.

For qualitative research Creswell & Miller (2000) proposes that the selection of procedures may be guided by the lens (which perspective) an inquirer chooses to evaluate a study, and a researchers own paradigmatic assumptions. For this purpose, they define validity as 'how accurately the account represents participants' realities of the social phenomena and is credible to them' (pp.124-125) this definition focuses on the inferences drawn from data, not the data itself. For validation the preference of Creswell & Miller (2000) is one that emphasises process rather than verification. They offer a framework for thinking about

validation in qualitative research that involves the selection of strategies to document the accuracy and establish the credibility of a study. The selection of validity strategies is informed by the lenses used by a researcher and their paradigmatic assumptions. According to Creswell & Miller lenses may include that of the researcher, study participants, or individuals external to the study. They organise research paradigms into three groupings, Post-positivist or systematic paradigms, constructivist paradigms, and critical paradigms (Creswell & Miller, 2000).

Using lenses and paradigms Creswell & Miller (2000) propose a framework for organising different types of validity and reliability procedures. Table 51: presents the framework in which they position nine validity procedures that include triangulation, member checking, the audit trail, disconfirming evidence, prolonged engagement in the field, thick rich description, research reflectivity, collaboration, and peer debriefing.

Paradigm assumption/Lens	**Post-positivist or systematic paradigm**	**Constructivist Paradigm**	**Critical paradigm**
Lens of the researcher	Triangulation	Disconfirming evidence	Researcher reflexivity
Lens of the study participants	Member checking	Prolonged engagement in the field	Collaboration
Lens of the people external to the study (reviewers, readers).	The audit trail	Thick, rich description	Peer debriefing

Table 51: Reproduction of the validity procedures within qualitative lens and paradigm assumptions table (Creswell & Miller, 2000, p. 126)

11.4.3. The mixed methods approach to quality

This section presents the mixed methods approach to quality adopted by this thesis. When mixing methods this thesis followed a dialectic stance of Greene (2007), which embraced the difference between approaches in dialogue and sees tension as inherently a good thing. To address quality when paradigms, mental models, and methodological traditions are mixed Greene (2007, pp. 166–167) proposes that it may be addressed in two ways:

1. For warranting the quality of method and the data obtained, adhere to the quality criteria and procedures of the tradition in which the method is being implemented.
2. For warranting the quality of inferences, conclusions, and interpretations made, adopt a multiplicstic stance that:
    a. Focuses on the available data support for the inferences, using data of multiple and diverse kinds;
    b. Could include criteria or stances from different methodological traditions;
    c. Considers warrants for inquiry inferences a matter of persuasive argument, in addition to the matter of fulfilling established criteria; and
    d. Attends to the nature and extent of the better understanding that is reached with this mixed methods design.

In this thesis each phase of the sequential emergent multiphase mixed methods design was underpinned by a different paradigmatic stance. Phase One followed the Interpretivist stance, Phase Two the post-positivist stance, and Phase Three the Hermeneutic and Phenomenological stances. Following the two approaches to quality proposed by Greene (2007), in this thesis two levels of strategy were employed to address validity and reliability. Strategies and procedures were embedded in each phase of the research, and strategies were implemented across the mixed methods design.

The Phase One study followed the qualitative research tradition, underpinned by an Interpretivist epistemology. The Phase One study employed the qualitative strategies of collaboration, thick, rich description, and member checking to ensure quality of data and inferences.

Collaboration was facilitated through the direct involvement of participants in the interpretation and analysis of card sort data during the focus group exercise. The participants' interpretation led to the themes and sort categories which formed the results of the study.

Thick, rich description of the study in this thesis was employed to provide readers with a detailed understanding of the study, allowing them to make their own judgments about its credibility. Participants were provided with an opportunity to review the data and themes following the conclusion of a focus group session.

The Phase Two study followed the quantitative tradition and was underpinned by the post-positivist research paradigm. The study relied upon an online self-report questionnaire to collect responses from participants. Strategies and procedures were employed during design and analysis of questionnaire results to address potential validity and reliability issues.

The questionnaire was designed drawing on items from established surveys (pew) and consciously with regards to the influence that questions can have on respondents' answers in a self-report questionnaire. Attention was given to the wording of questions, question length, the use of positive or negative items, and the proximity of items on the questionnaire. The length of the questionnaire was viewed as a potential issue, questions were organized into sections (smaller chunks), and progress information was also displayed to help participants stay focused.

Procedures were employed to reduce different kinds of method bias. Social desirability bias was not seen as a significant concern as the questionnaire did not deal with any socially sensitive topics. However, ownership of a mobile phone was identified as a possible source of social desirability bias, since a phone can be an indicator of social status. This was addressed by asking multiple and specific questions about mobile phone ownership. Language barriers were identified as a potential issue when surveying international students whose first language was not English, to an extent this may be balanced by a respondents' level of education, but care was taken to make question wording clear and easy to understand.

Item Response Theory (IRT) was applied during analysis to evaluate the quality of survey results for questions 5.b and 5.c which measured specific latent traits. IRT methods offer a framework for exploring qualitative variation such as that present in Likert-scale results and a means of scaling results for individuals from diverse groups onto a common scale (i.e. gender, language or nationality). This provides an understanding of how latent traits vary between different groups which can be used to adjust for the differences between groups (Reise, Ainsworth, & Haviland, 2005). Questions 5.a and 5.h were also included to help

verify that the scales in questions 5.b and 5.c measured the constructs they were intended to measure by asking respondents questions with more direct wording.

The Phase Three study followed the qualitative tradition and was underpinned by the hermeneutic research paradigm following a social phenomenological methodology. The study employed the qualitative strategies of thick, rich description, disconfirming evidence, and member checking to manage validity and reliability.

Thick, rich description was used to describe the lived experience of participants, themes arising from analysis were mapped across individual cases and the voice of participants captured in the use of direct quotes to support the emerging thematic groupings. The practice of seeking disconfirming evidence is captured in the range of themes and diversity of views presented. Examples of negative and positive experience along with divergent views were sought when constructing and describing themes. During analysis an international student from outside the study was brought in to participate in the thematic coding process. Thematic groupings were established through discussion and agreement between the two, in this way the international student's views were treated with equal weight to those of the researcher. Member checking was facilitated by allowing participants to review their interview transcripts.

The strategies of triangulation, reflexivity and creating an audit trail were applied across the sequential emergent multiphase mixed methods research design.

The strategy of methodological triangulation provided the framework for the research design. Within the design between-method triangulation was employed as a strategy to evaluate the correspondence between the results of the different phases, and to create a set of mixed results. Triangulation was facilitated through a mixed analysis of the results from all three phases. This process developed a chain of evidence and a narrative which provides evidence for the credibility and dependability of this thesis.

The strategy of researcher reflexivity has been employed when reporting of each phase of the research design and across the thesis broadly. The researcher's views, bias, decision making, procedures and process followed are presented in detail. As much as possible participants were involved in the research process, allowing them to question and challenge the researcher's views. This provided a level of accountability to the research participants and

transparency on the researcher's behalf. The strategy of reflexivity lends itself to creating an audit trail. Processes and procedures followed during each phase of research are described in detail, records have been created to enable audit and review of the research and the findings of this thesis.

11.5. Limitations

This part of Chapter 11 presents the limitations of this thesis. While this thesis presents a substantial body of work it is not without its limitations. Three kinds of limitations are discussed, the limitations due to: methodological complexity; limitations in validation, and reliability and limitations in participant recruitment.

Methodological limitation relates to the complexity of the sequential emergent multi-phase mixed methods research design. The design supported the exploratory nature of the research but due to the constraints of time, and in the interest in retaining the scope of this thesis, the level of detail that has been presented in this thesis is limited to an extent. Specifically, a rich description of the international student experience in Tasmania is present in the mixed methods results but its presentation in full is beyond the scope of this thesis. The methodological focus of this thesis has also meant that an empirical approach towards addressing the research problem has been privileged. While current theory has guided the research process, engagement with the literate has been limited by the emphasis on method.

Establishing validity and reliability are limitations inherent in mixed methods research designs. Appropriate procedures for establishing validity and reliability specific to mixed methods research are still in their infancy but generally they involve strategies to address potential issues of data collection, analysis and interpretation that might compromise mixing of qualitative or quantitative phases and conclusions drawn from them (Creswell & Clark, 2011). In this thesis, as much as possible, methodological rigour was pursued in each phase of the research. In Phase One and Phase Three, which were underpinned by an interpretive paradigm, principles described by Lincoln and Guba (1994) particularly those of voice and reflectivity, were used for both participants and the researcher. Both research designs placed emphasis on participant voice and reflexivity in data collection and analysis. Techniques were employed to ensure that the voice of international students was heard in data collection and reported faithfully in data analysis. Techniques also placed emphasis on reflexivity by participants, engaging them in the research process and helping them to reflect on it.

Limitations emerge through in presentation of results and analysis by this thesis where time and space have limited the extent to which the voices of all participants may be presented. This limitation introduces a level of bias on behalf of the researcher when decisions have been made to include or exclude the accounts of research participants in the presented results of analysis. The small numbers of participants for Phase One (n = 9) and Phase Three (n = 15) also limits the generalisability of results in a probabilistic sense but not their validity from the interpretivist point of view, which underpinned Phase One and Phase Three. Phase Two followed a post-positivist paradigm, and objectivity was achieved through the use of an online survey instrument which reduced potential bias of results due to the researcher's presence, but limitations are present in the survey instrument design where bias may exist in the wording or order of questions. The generalisability of survey results is also limited by the purposeful sampling procedure followed and small sample size obtained (n = 63), this limitation is balanced against the fact that a sample was obtained which turned out to resemble some demographic characteristics of the population and that generalisability of results for the sake of inference was not a primary objective of the Phase Two study.

The recruitment of international students posed a limitation for each of the three research phases. Limited communication channels made it difficult to reach international students staying in Tasmania. The University of Tasmania and the university English Language Centre (ELC) did provide support by distributing a bulk email and posting an advertisement in biweekly newsletters during recruitment. However, response rates were low and those international students recruited in this way were difficult to motivate when participation was required. For instance, the Phase One study recruited 25 international students but only 9 responded when a call for participants went out. In the Phase Two study approximately 150 international students were recruited but only 63 ended up completing the survey questionnaire in full. A purposeful sampling strategy proved to be the most effective means of recruiting international students, but this strategy limits the usefulness of results for making inferences through probabilistic research methods. Purposeful sampling also potentially created bias on behalf of the researcher, as the researcher was responsible for determining how and where participants were recruited. This limitation is mitigated to an extent by the comprehensive recruitment strategies adopted for each phase of the research.

11.6. Future work

This part of Chapter 11 presents opportunities for future work which emerged from this thesis. Three opportunities for future work are identified, which emerge from the mixed methods findings. The first is an opportunity to further evaluate a model of the international student sojourn experience, the second is the opportunity to further understand the factors that mediate acculturation and the third is an opportunity to develop a scale to measure the Information and Communication Technology (ICT) capabilities of international students.

There is opportunity for further evaluation of the conceptual model of an international student's sojourn experience presented in Chapter 10. A more comprehensive study following the Phase One study's research design would provide further validation of the relationships between the sojourn experience and change in ICTs or in certain ICTs like the phone. A further study may focus on homogenous groups of international students at the same stage of the sojourn experience, to understand what the experience means to an international student or to that group and the specific characteristics that are important to them. Comparison of groups at different stages, and in different contexts, can further broaden understanding of the sojourn experience, how it influences what is important and the role of ICTs in mediating this experience.

Further evaluation of mediating factors in acculturation is also warranted, particularly using methods like mediation and path analysis to specifically examine the mediating influence of ICTs. Understanding how contextual factors and variables at different levels are mediated by ICTs, which ICTs are important and which contexts and variables are affected can broaden current understandings of the acculturation experience as a multidimensional concept. Approaches which follow a practice approach would be able to provide understandings of the role that human and non-human entities play in the complex process of adjustment. Understanding the acculturation process as experience, particularly from an insider's perspective, is needed to better understand what cultural change means to different groups of migrants in different contexts – particularly international students. This would provide insight into how international students perceive cultural adjustment, whether they value it and what is valuable in that process.

There is opportunity to develop the scale and survey instruments evaluated in Chapters 6 and 7 to study the ICT capabilities of individuals. The survey instrument can be refined based on

results of exploratory analysis presented in Chapter 7. The new questionnaire can look at specific relationships noted in findings presented in Chapter 10, Part 10.4.2. such as the length of time abroad, time owning a mobile phone, capability measured by the scale instrument and other characteristics like age, gender and nationality in a statistically significant sample of the international student population. Groups may also be targeted through stratified sampling to look at specific differences in circumstance, particularly upon arrival. A further survey would allow hypothesis testing, and the use of more robust statistical techniques including Regression and General Linear Models (GLMs) for the evaluation of survey and scale instrument results.

Such an instrument may be usefully included along with measures of acculturation to understand how capability and thus the adopting and/or appropriation of different ICTs is related to acculturation variables, such as perceived social support. For example, is it the case that there is a difference in acculturation outcomes between a group of international students who own a smart phone compared to those who do not?

11.7. Summary

This part of Chapter 11 presents a summary of the chapter. Chapter 11 has presented conclusions for this thesis in five parts. Part 11.2 presented a summary of the research findings for this thesis. Part 11.3 presented the significant contributions which this thesis makes to scholarship, describing substantive, methodological and theoretical contributions. Part 11.4 presented the approach taken towards validity and reliability by this thesis. Part 11.5 presented the limitations of the research approach adopted by this thesis, and part 11.6 presented opportunities for future work which emerged from the research.

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13. Appendices

13.1. Interview Guide

This is a guide only not a questionnaire and shall be used lightly to help structure an interview. An interview shall start with the researcher providing a general introduction to the research, and providing copies of the Information Sheet, and Consent Form that each participant will be asked to read, understand and sign before the interview can commence. The research shall answer any questions that participants may have.

Part 1: The Journey

To start with I am interested in hearing about you and your journey as an international student, how has your journey been, and what has it been like to stay in Tasmania? What are your motivations for coming to say in Tasmania? What is your current situation like and how might you spend an average day? Current situation (some themes for discussion):

- Arrival and orientation
- Accommodation
- What are your current living arrangements like?
- Communication and Language
- Transportation and Travel
- Social Life
- Do you stay in-touch with friends and family back home?
- Have you made new friends here since you arrived?
- Do you have much involvement with the community?
- Economic situation
- Are you currently working?
- Service Access i.e. Health Care, Visa
- Academic Life

Part 2: Information Source Horizon Exercise

The exercise shall start with a participant being given an ISH map, a pen, and a selection of cards for writing on. This is a think aloud exercise, meaning that you will be asked to talk through your thinking and describe what you are doing.

1. Describe topics of interest that you regularly monitor in your daily life while staying in Tasmania, write them down on the cards provided.
    a. Why is this topic significant to you?
    b. How much time might you budget each day to keep up-to-date with it?
2. Now that we have some topics written down think of the sources of information that you would normally select to find out some information about them. Using the ISH Map provided, think about your topics of interest and write down on the map the information sources that you would normally select to find information that keeps you up-to-date. The further away from the centre that you place a source, the less important we will consider it to be.
    a. Firstly, where would you place yourself on this map?
3. For each source that comes to mind:
    a. Think about where you would place it 'why did you place a source there?'
    b. Why is this source important to you (or not)? Are there any details about this source that standout to you?
    c. What criteria were you thinking of when placing this source on the ISH map?

Part 3: Reflection

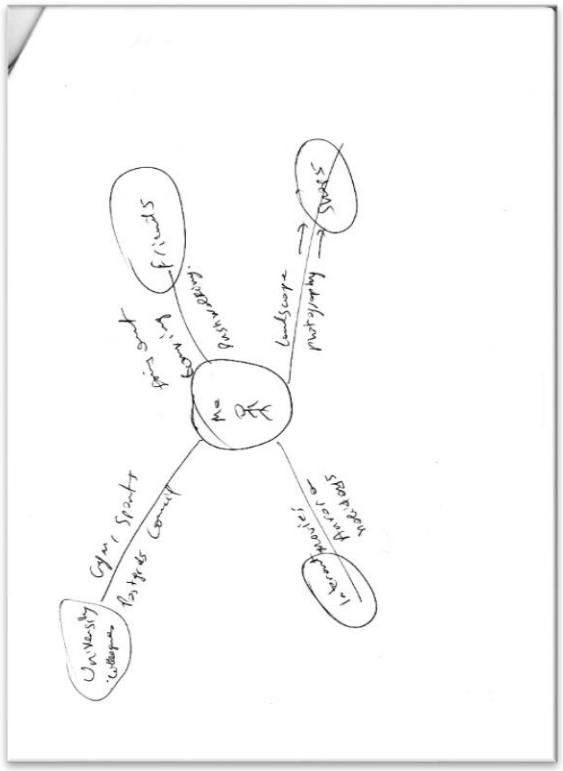
Once all topics are exhausted you cannot think of anymore sources reflect on the exercise, and think about the following questions:

- Does your ISH map accurately reflects all the kinds of sources that you might select to find information?
- Do you think that your habits of looking for information have changed much since you came to stay in Tasmania?
- Do you think that the topics of interest to you have changed much since you have come to stay in Tasmania?

Any further discussion?

13.2. Information Source Horizon maps

Figure 52: ISH map 1



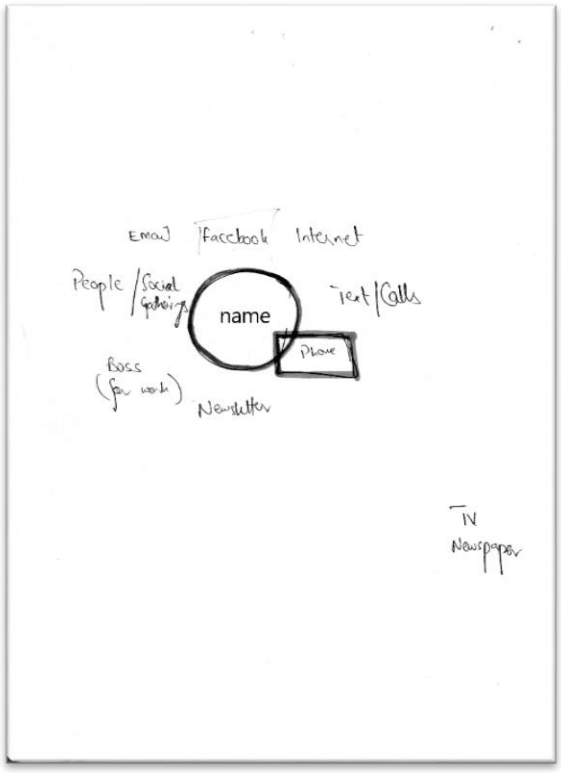
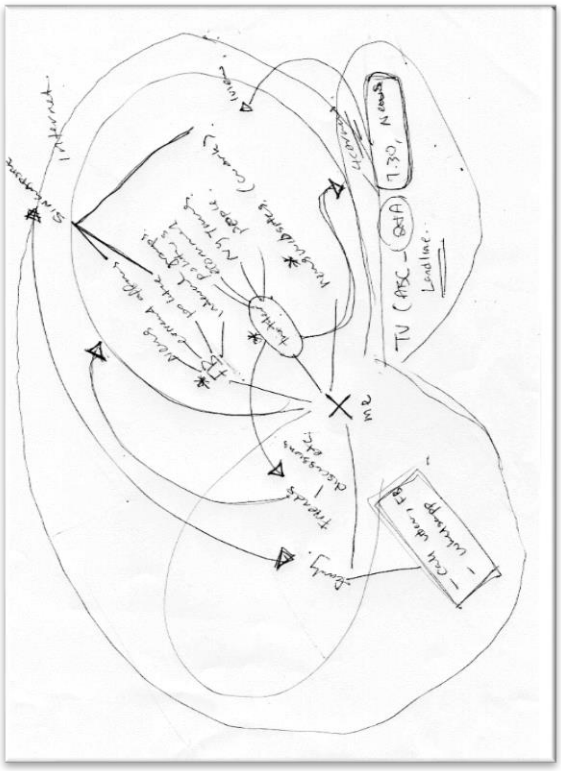


Figure 53: ISH map 2

Figure 54: ISH map 3



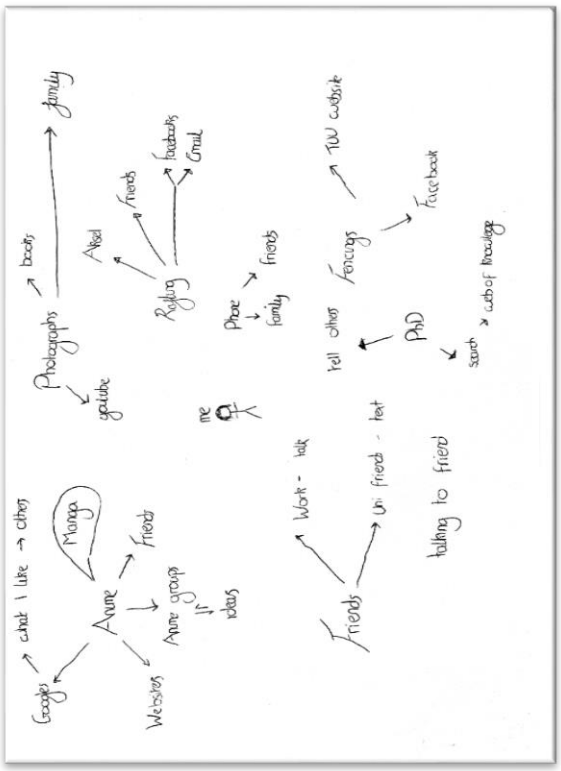


Figure 55: ISH map 4

Figure 56: ISH map 5

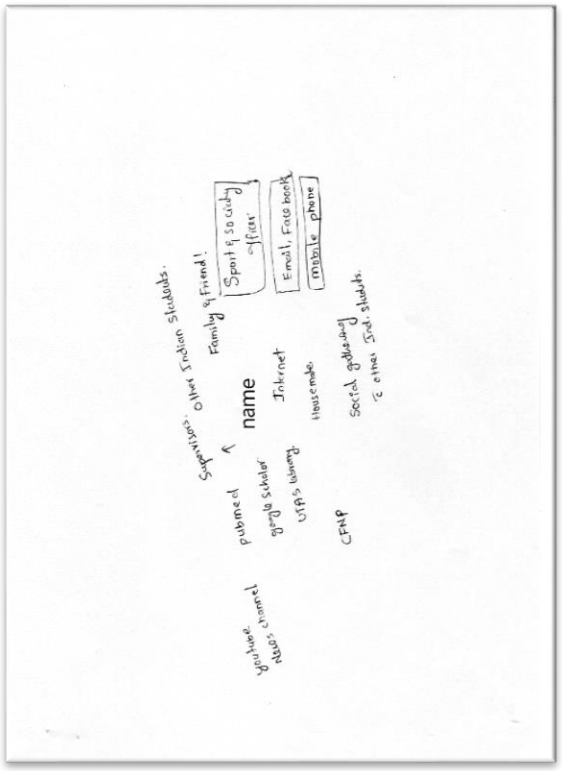


Figure 57: ISH map 6

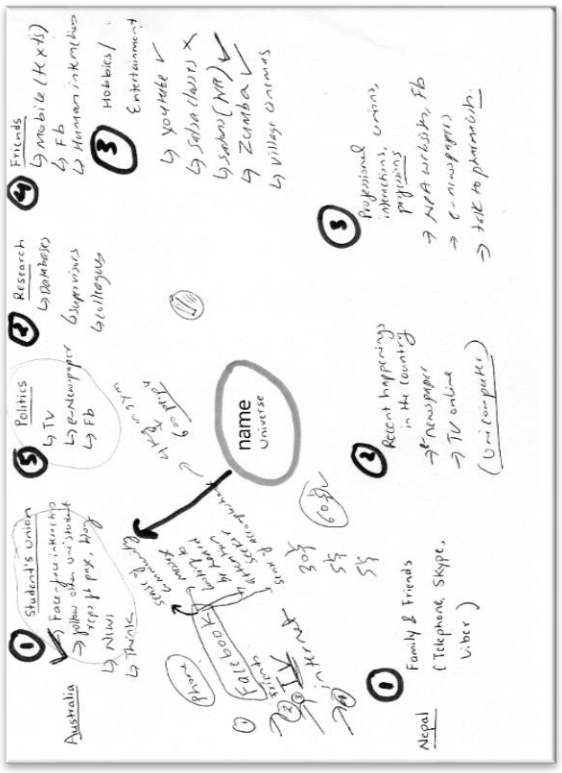


Figure 58: ISH map 7

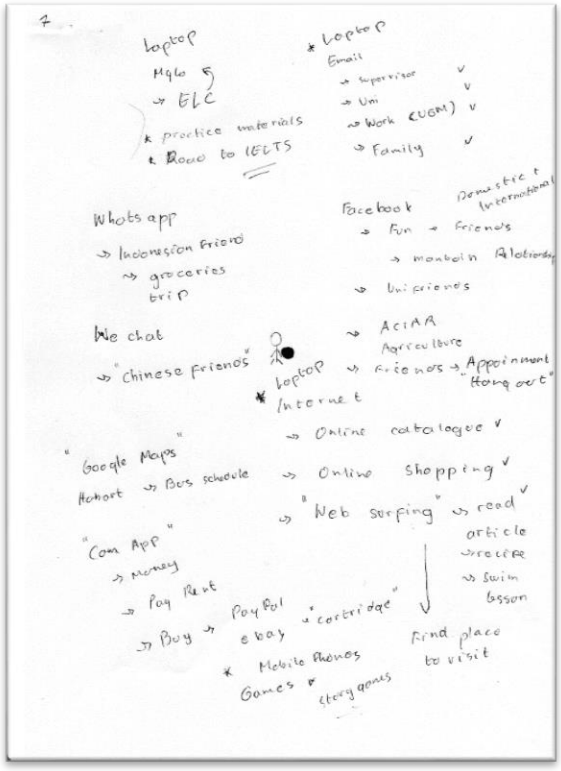


Figure 59: ISH map 8

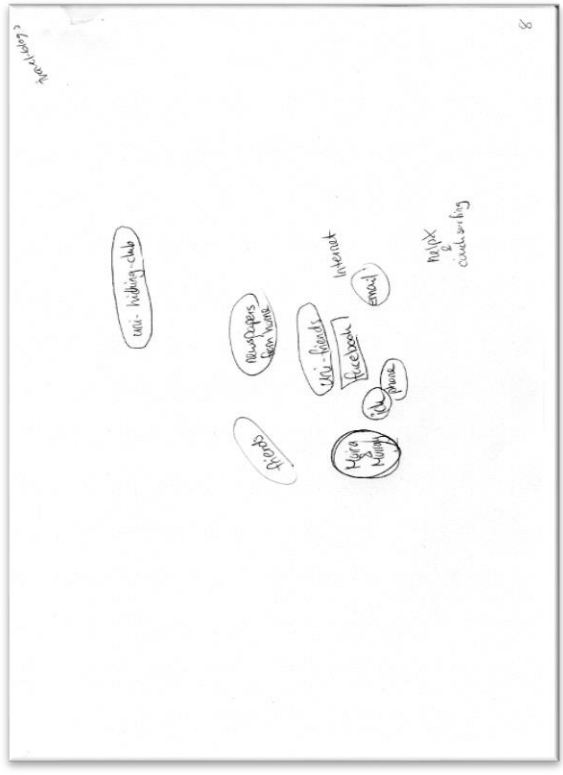


Figure 60: ISH map 9

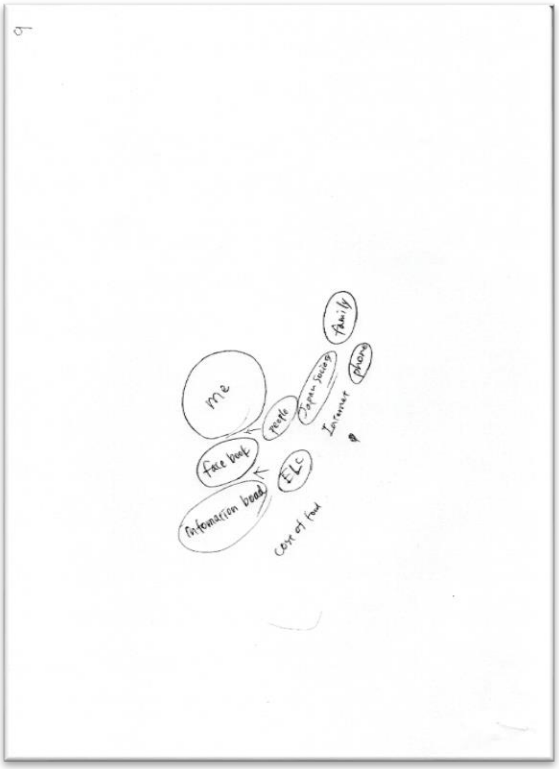


Figure 61: ISH map 10

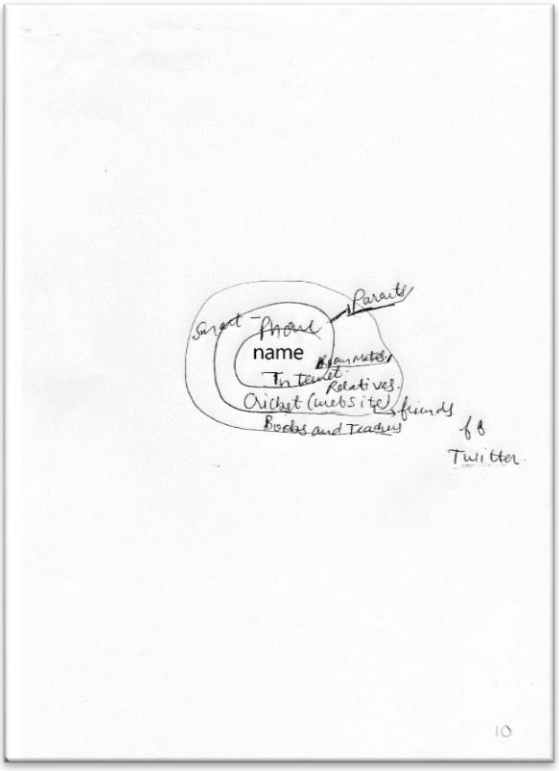


Figure 62: ISH map 11

Figure 63: ISH map 12

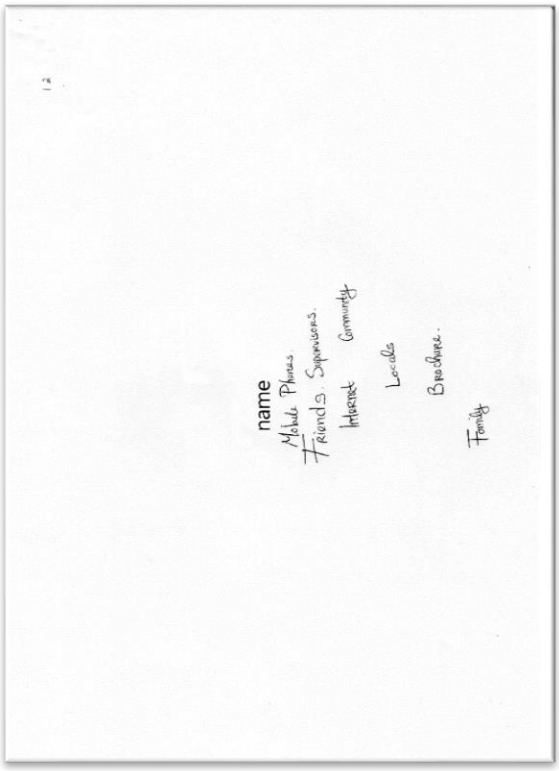


Figure 64: ISH map 13

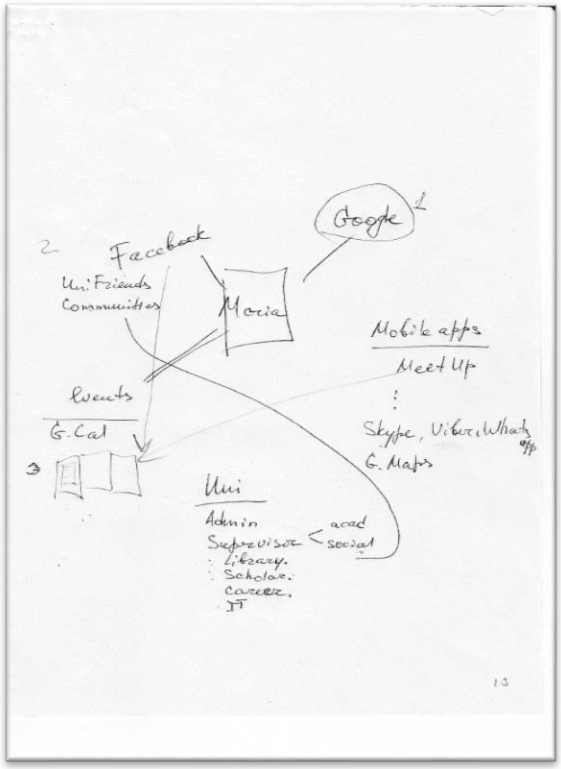


Figure 65: ISH map 14

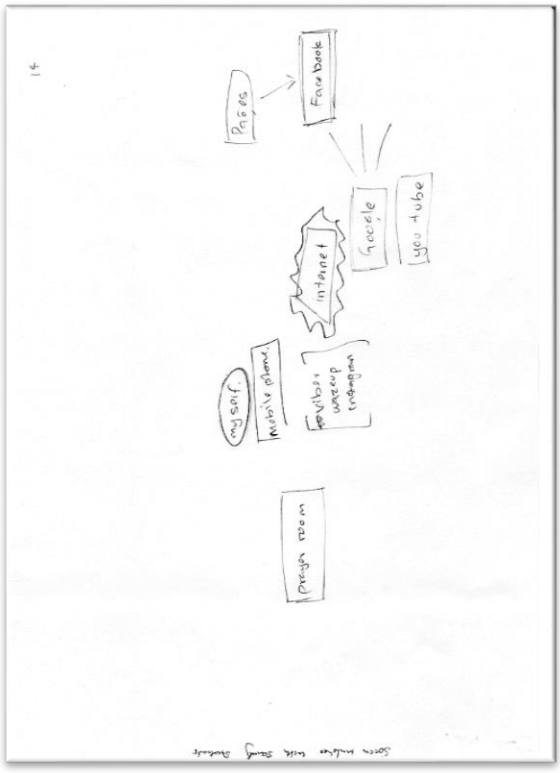
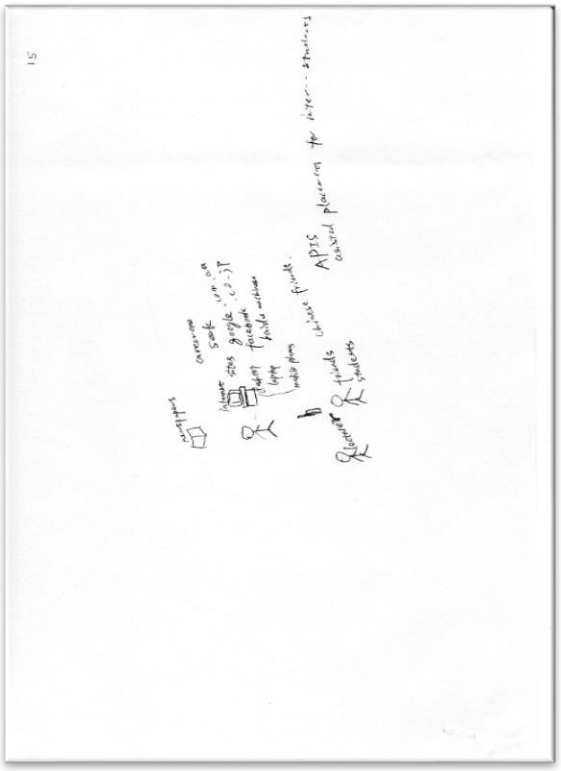


Figure 66: ISH map 15



13.3. Phase Two questionnaire

International Student Travel, Mobile Phone Use and Life in Tasmania

This is a questionnaire about international student travel, mobile phone use and life while studying in Tasmania. The questionnaire will take approximately 15 minutes of your time to complete.

We welcome your participation in this study, please make sure that you have read all the relevant information provided at http://harryrolf.com before completing this questionnaire. If you have any questions please contact [email].

Welcome to the survey, before you can begin there are a few things we need to check. By registering for this study you will have been provided with general information and consent information (terms of participation) previously, however it is important we go over other this one more time.

Terms of Participation - Consent Form

To participate in this study you need to have read all relevant information provided at http://harryrolf.com. You also need to agree to the following terms of participation (these are the same as those you will have seen on the registration form). Please read them carefully.

1. I agree to take part in the research study named above.

2. I have read and understood the Information Sheet for this study.

3. The nature and possible effects of the study have been explained to me.

4. I understand that the study involves completing an online questionnaire that will take approximately 15 minutes of my time.

5. I understand that participation involves no risk(s) to me. I understand that all research data will be securely stored on the University of Tasmania's premises for five years from the publication of the study results, and will then be destroyed.

6. Any questions that I have asked have been answered to my satisfaction.

7. I understand that the researcher(s) will maintain confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research.

8. I understand that the results of the study will be published so that I cannot be identified as a participant.

9. I understand that my participation is voluntary and that I may withdraw at any time without any effect prior to submitting a completed survey. But i understand that I will not be able to withdraw my data after completing and submitting the survey, as results are de-identified once submitted.

By participating in this study you are agreeing to the conditions above and acknowledging that you have read and understand all information provided to you about the study.

There are 37 questions in this survey

About You

Questions in this section are about you personally.

[1.a]How old are you (in years)? *

Please write your answer here:

What is your age - in years?

[1.b]What is your Gender? *

Please choose **only one** of the following:

- ○ Female
- ○ Male

[1.c]Is English your first spoken language? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

Is it the language you first learnt to speak?

[1.d]What is your first spoke language?

Only answer this question if the following conditions are met:
Answer was 'No' at question '3 [C003]' (Is English your first spoken language?)

Please write your answer here:

[1.e]What is your Nationality? *

Please choose **only one** of the following:

- ○ ac – Ascension Island
- ○ ad – Andorra
- ○ ited Arab Emirates af –
- ○ Afghanistan
- ○ ag – Antigua and Barbuda
- ○ ai – Anguillaal
- ○ al – Albania
- ○ …
- ○ Other

This is usually the Country in which you hold citizenship..

Travel, study and Australia

The following questions are about your travel, study and life while in Australia.

[2.a]Before you first travelled to Australia had you ever travelled abroad to another Country, for any reason? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

[2.b]Before you first traveled to Australia, had you ever lived in a country other than your home country, for any le

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '6 [C101]' (Before you first travelled to Australia had you ever travelled abroad to another Country, for any reason?)

Please choose **only one** of the following:

- ○ Yes
- ○ No

Your home country is usualy the country in which you hold citizenship.

[2.c]Before you enrolled to study at the University of Tasmania, had you visited Australia for any length of time? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

[2.d]Have you studied any of the following kinds of courses in Australia before enrolling to study at the University of Tasmania? *

Please choose **all** that apply:

- ☐ ELICOS Course (English Language Intensive Courses for Overseas Students)
- ☐ VET Course (Vocational Education and Training)
- ☐ Public of Private School Course
- ☐ Another kind of Course

[2.e]What type of degree course are you currently enrolled to study at the University of Tasmania? *

Please choose **only one** of the following:

- ○ Diploma
- ○ Bachelors Degree
- ○ Postgraduate (Course Work) Degree
- ○ Postgraduate (Research) Degree
- ○ Other Course

[2.f]Which University of Tasmania Campus are you enrolled to study at? *

Please choose **only one** of the following:

- ○ Hobart
- ○ Launceston
- ○ Cradle Coast (North West Campus)
- ○ Other [ ]

[2.g]For how long have you been enrolled as a student at the University of Tasmania? *

Please choose **only one** of the following:

- ○ First Year
- ○ Second Year
- ○ Third Year
- ○ Fourth Year
- ○ Fifth Year or more

[2.h]Do you currently have any family or relatives living in Australia? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

[2.i]Do you have any family or relatives living in Tasmania?

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '13 [C108]' (Do you currently have any family or relatives living in Australia?)

Please choose **only one** of the following:

- ○ Yes
- ○ No

Living Arrangements

The following questions are about your living arrangements while staying in Tasmania

[3.a]For how many months (approximately) have you been living in Tasmania?*

Please write your answer here:

Please enter only whole numbers, if you have been living in Tasmania for 6 Months and 9 days, 6 Months is a sufficient answer.

[3.b]Please indicate from where your main source of income comes from, while living in Tasmania

Please choose **only one** of the following:

- ○ Family
- ○ Own funds
- ○ Employer
- ○ Loan
- ○ University Scholarship
- ○ Home country government scholarship
- ○ Australian government scholarship
- ○ Other sponsored scholarship
- ○ Government or state funding
- ○ AusAID
- ○ Research Council funding
- ○ Other

[3.c]Please indicate your current living arrangement while staying in Tasmania

Please choose **only one** of the following:

- ○ By yourself
- ○ With friends
- ○ With family or relatives
- ○ Shared accommodation
- ○ In a 'home stay' arrangement
- ○ Other

[3.d]Do you have access to a Desktop Computer where you are living?

Please choose **only one** of the following:

- ○ Yes
- ○ No

[3.e]Do you have access to an Internet Connection where you are living?

Please choose **only one** of the following:

- ○ Yes
- ○ No

[3.f]Do you have access to a landline (telephone) where you are living?

Please choose **only one** of the following:

- ○ Yes
- ○ No

[3.g]Do you currently own any of the following items? *

Please choose **all** that apply:

- ☐ Laptop or Netbook Computer
- ☐ Tablet Computer (such as an iPad, Android or Windows tablet)
- ☐ E-Reader (Such as a Kindle)

Mobile Phone Use

The following questions are about your personal mobile phone, the one you mainly use while living in Tasmania.

[4.a]Do you currently own a mobile phone? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

[4.b]What is the main reason that you do not own a mobile phone?

Only answer this question if the following conditions are met:
Answer was 'No' at question '22 [C301]' (Do you currently own a mobile phone?)

Please choose **only one** of the following:

- ○ Cannot afford it
- ○ No access to it
- ○ Don't know how to use it
- ○ No need/or interest
- ○ No time/to busy
- ○ I have a disability that prevents me from using it
- ○ Other [ ]

[4.c]Do you currently own more than one mobile phone?

Please choose **only one** of the following:

- ○ Yes
- ○ No

[4.c.i]What is the main reason for you to own more than one mobile phone?

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '24 [C303]' (Do you currently own more than one mobile phone?)

Please write your answer here:

[4.d]For how many months (Approximatly) have you owned your current mobile phone? *

Please write your answer here:

[4.e]Some mobile phones are called 'smart phones' because of certain features that they have such as software applications (Apps), internet access and/or a touch screen. Is your mobile phone a smart phone? *

Please choose **only one** of the following:

- ○ Yes
- ○ No

[4.f]Which of the following best describes the kind of mobile phone that you have? *

Please choose **only one** of the following:

- ○ iPhone
- ○ Blackberry
- ○ Android Phone
- ○ Windows Phone
- ○ Other

[4.g]On average how much money (is dollars) do you spend on your mobile phone bill each month? *

Please write your answer here:

[5.a]Thinking about your mobile phone, how would you rate your ability to use it? *

Please choose **only one** of the following:

- ○ Very Good
- ○ Good
- ○ Okay
- ○ Poor
- ○ Very Poor

[5.b]Thinking about how you use your mobile phone while staying in Tasmania. How often would you say that you have used it to do the following?

Please choose the appropriate response for each item:

	Never	Less often	A few times a week	Once a day	Several times a day
Send or receive a text message (SMS or MMS)	○	○	○	○	○
Use or download software applications (Apps)	○	○	○	○	○
Send or receive an email	○	○	○	○	○
Access the internet using a web browser	○	○	○	○	○
Use social media (such a facebook, twitter etc.)	○	○	○	○	○
Take a picture	○	○	○	○	○
Record some audio	○	○	○	○	○
Record a video	○	○	○	○	○

[5.c] Thinking about thngs that you have done using your mobile phone recently. In the last 30 days have you used your mobile phone to find-out some information about any of the following. *

Please choose the appropriate response for each item:

	Yes	Uncertain	No
Accomodation	○	○	○
Transportation	○	○	○
Finances	○	○	○
Health	○	○	○
Support services	○	○	○
Your studies	○	○	○
Employment	○	○	○
Food or other essential items for your daily life?	○	○	○

[5.d]In the last 30 days have you used your mobile phone to coordinate a gathering, meeting, date or get together? *

Please choose **only one** of the following:

○ Yes
○ No

[5.e]In the last 30 days have you used your mobile phone to contact a friend, family member or relative in a country outside Australia? *

Please choose **only one** of the following:

○ Yes
○ No

[5.f]What is the main way in which you contacted that person using your mobile phone?

Only answer this question if the following conditions are met:
Answer was 'Yes' at question '34 [C313]' (In the last 30 days have you used your mobile phone to contact a friend, family member or relative in a country outside Australia?)

Please write your answer here:

[5.g]In the last 30 days have you used your mobile phone to share some information with two or more people using your mobile phone?

Please choose **only one** of the following:

- ○ Yes
- ○ No

[5.h]If you were to lose your mobile phone for some reason, how significantly do you think not having your mobile phone would affect your life? *

Please choose **only one** of the following:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Where 1 = Not Significantly and 5 = Very Significantly

14. Tables

14.1. Phase One tables

Term / Item	Sort 1	%	Sort 2	%	Sort 3	%	Total	%
QQ	5	7.25	6	15.79	6	15.79	17	11.72
e-mail	6	8.70	5	13.16	5	13.16	16	11.03
face to face	3	4.35	4	10.53	7	18.42	14	9.66
Facebook	7	10.14	4	10.53	0	0.00	11	7.59
text message	5	7.25	2	5.26	3	7.89	10	6.90
phone	2	2.90	2	5.26	3	7.89	7	4.83
mobile	3	4.35	1	2.63	2	5.26	6	4.14
phone call	2	2.90	1	2.63	3	7.89	6	4.14
MSN	5	7.25	0	0.00	0	0.00	5	3.45
communication	2	2.90	1	2.63	1	2.63	4	2.76
meeting	2	2.90	2	5.26	0	0.00	4	2.76
renren.com	1	1.45	2	5.26	1	2.63	4	2.76
Gtalk	2	2.90	1	2.63	0	0.00	3	2.07
sms	1	1.45	1	2.63	1	2.63	3	2.07
telephone	1	1.45	0	0.00	2	5.26	3	2.07
Twitter	3	4.35	0	0.00	0	0.00	3	2.07
Hangout	1	1.45	1	2.63	0	0.00	2	1.38
micro blog	1	1.45	0	0.00	1	2.63	2	1.38
mobile phone call	1	1.45	0	0.00	1	2.63	2	1.38
social network	1	1.45	0	0.00	1	2.63	2	1.38
Telstra	1	1.45	1	2.63	0	0.00	2	1.38
video talk	1	1.45	1	2.63	0	0.00	2	1.38
voice message	1	1.45	1	2.63	0	0.00	2	1.38
church	1	1.45	0	0.00	0	0.00	1	0.69
date	1	1.45	0	0.00	0	0.00	1	0.69
formal meeting	0	0.00	1	2.63	0	0.00	1	0.69
g-mail	1	1.45	0	0.00	0	0.00	1	0.69
Internet	1	1.45	0	0.00	0	0.00	1	0.69
online chatting	1	1.45	0	0.00	0	0.00	1	0.69
Optus	1	1.45	0	0.00	0	0.00	1	0.69
postcard	1	1.45	0	0.00	0	0.00	1	0.69
Skype	1	1.45	0	0.00	0	0.00	1	0.69
SNS website	1	1.45	0	0.00	0	0.00	1	0.69
social activity	1	1.45	0	0.00	0	0.00	1	0.69
telephone calls	0	0.00	0	0.00	1	2.63	1	0.69
Vodafone	1	1.45	0	0.00	0	0.00	1	0.69
web-mail	0	0.00	1	2.63	0	0.00	1	0.69
what's up	1	1.45	0	0.00	0	0.00	1	0.69
Total	**69**	**100%**	**38**	**100%**	**38**	**100%**	**145**	**100%**

Table 52: Term/item frequencies and proportions for all focus groups categorised by sort

Term/Items	Row Relative frequencies				Column Relative frequencies			
	Sort 1	Sort 2	Sort 3	R. Mass	Sort 1	Sort 2	Sort 3	Average C. profile
church	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
communication	0.500	0.250	0.250	0.028	0.029	0.026	0.026	0.028
date	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
e-mail	0.375	0.313	0.313	0.110	0.087	0.132	0.132	0.110
face to face	0.214	0.286	0.500	0.097	0.043	0.105	0.184	0.097
Facebook	0.636	0.364	0.000	0.076	0.101	0.105	0.000	0.076
formal meeting	0.000	1.000	0.000	0.007	0.000	0.026	0.000	0.007
g-mail	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
Gtalk	0.667	0.333	0.000	0.021	0.029	0.026	0.000	0.021
Hangout	0.500	0.500	0.000	0.014	0.014	0.026	0.000	0.014
Internet	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
meeting	0.500	0.500	0.000	0.028	0.029	0.053	0.000	0.028
micro blog	0.500	0.000	0.500	0.014	0.014	0.000	0.026	0.014
mobile	0.500	0.167	0.333	0.041	0.043	0.026	0.053	0.041
mobile phone call	0.500	0.000	0.500	0.014	0.014	0.000	0.026	0.014
MSN	1.000	0.000	0.000	0.034	0.072	0.000	0.000	0.034
online chatting	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
Optus	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
phone	0.286	0.286	0.429	0.048	0.029	0.053	0.079	0.048
phone call	0.333	0.167	0.500	0.041	0.029	0.026	0.079	0.041
postcard	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
QQ	0.294	0.353	0.353	0.117	0.072	0.158	0.158	0.117
renren.com	0.250	0.500	0.250	0.028	0.014	0.053	0.026	0.028
Skype	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
sms	0.333	0.333	0.333	0.021	0.014	0.026	0.026	0.021
SNS website	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
social network	0.500	0.000	0.500	0.014	0.014	0.000	0.026	0.014
social activity	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
telephone	0.333	0.000	0.667	0.021	0.014	0.000	0.053	0.021
telephone calls	0.000	0.000	1.000	0.007	0.000	0.000	0.026	0.007
Telstra	0.500	0.500	0.000	0.014	0.014	0.026	0.000	0.014
text message	0.500	0.200	0.300	0.069	0.072	0.053	0.079	0.069
Twitter	1.000	0.000	0.000	0.021	0.043	0.000	0.000	0.021
video talk	0.500	0.500	0.000	0.014	0.014	0.026	0.000	0.014
Vodafone	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
voice message	0.500	0.500	0.000	0.014	0.014	0.026	0.000	0.014
web-mail	0.000	1.000	0.000	0.007	0.000	0.026	0.000	0.007
what's up	1.000	0.000	0.000	0.007	0.014	0.000	0.000	0.007
Average R. Profile	**0.476**	**0.262**	**0.262**		**0.476**	**0.262**	**0.262**	**C. Mass**

Table 53: Relative frequencies for rows and columns in CA

Rows										
ID	**name**	**mass**	**qlt**	**inr**	**k=1**	**cor**	**ctr**	**k=2**	**cor**	**ctr**
1	chrc	7	1000	18	-992	893	26	343	107	5
2	cmmn	28	1000	0	-46	893	0	16	107	0
3	date	7	1000	18	-992	893	26	343	107	5
4	emal	110	1000	11	191	893	15	-66	107	3
5	fctf	97	1000	84	592	968	130	108	32	7
6	fcbk	76	1000	65	-468	616	64	-369	384	67
7	frml	7	1000	47	448	71	5	-1617	929	117
8	gmal	7	1000	18	-992	893	26	343	107	5
9	Gtlk	21	1000	18	-512	731	21	-310	269	13
10	Hngt	14	1000	16	-272	154	4	-637	846	36
11	Intr	7	1000	18	-992	893	26	343	107	5
12	mtng	28	1000	32	-272	154	8	-637	846	72
13	mcrb	14	1000	16	180	68	2	668	932	40
14	mobl	41	1000	6	30	16	0	233	984	15
15	mblp	14	1000	16	180	68	2	668	932	40
16	MSN	34	1000	92	-992	893	131	343	107	26
17	onln	7	1000	18	-992	893	26	343	107	5
18	opts	7	1000	18	-992	893	26	343	107	5
19	phon	48	1000	21	424	979	34	62	21	1
20	phnc	41	1000	29	420	602	28	342	398	31
21	pstc	7	1000	18	-992	893	26	343	107	5
22	QQ	117	1000	38	344	893	53	-119	107	11
23	rnrn	28	1000	22	314	305	11	-474	695	40
24	skyp	7	1000	18	-992	893	26	343	107	5
25	sms	21	1000	4	270	893	6	-93	107	1
26	SNSw	7	1000	18	-992	893	26	343	107	5
27	scln	14	1000	16	180	68	2	668	932	40
28	sclc	7	1000	18	-992	893	26	343	107	5
29	telphn	21	1000	46	571	351	26	777	649	81
30	tlphnc	7	1000	47	1352	650	49	993	350	44
31	tlst	14	1000	16	-272	154	4	-637	846	36
32	txtm	69	1000	4	0	0	0	146	1000	10
33	twtt	21	1000	55	-992	893	78	343	107	16
34	vdtl	14	1000	16	-272	154	4	-637	846	36
35	vdph	7	1000	18	-992	893	26	343	107	5
36	vcms	14	1000	16	-272	154	4	-637	846	36
37	wbml	7	1000	47	448	71	5	-1617	929	117
38	whts	7	1000	18	-992	893	26	343	107	5
Columns										
ID	**name**	**mass**	**qlt**	**inr**	**k=1**	**cor**	**ctr**	**k=2**	**cor**	**ctr**
1	Srt1	476	1000	314	-505	933	468	135	67	56
2	Srt2	262	1000	289	228	114	53	-635	886	685
3	Srt3	262	1000	397	689	757	479	390	243	259

Table 54: Correspondence Analysis results for card sort data

Term / Item	Group A			Group B			Group C			Group D		
	Sort 1	Sort 2	Sort 3	Sort 1	Sort 2	Sort 3	Sort 1	Sort 2	Sort 3	Sort 1	Sort 2	Sort 3
church	0	0	0	0	0	0	1	0	0	0	0	0
communication	0	0	0	0	0	0	2	1	1	0	0	0
date	0	0	0	0	0	0	1	0	0	0	0	0
e-mail	2	2	0	1	1	3	3	2	2	0	0	0
face to face	1	0	1	1	3	3	1	1	2	0	0	1
facebook	1	1	0	2	0	0	2	3	0	2	0	0
formal meeting	0	1	0	0	0	0	0	0	0	0	0	0
g-mail	0	0	0	1	0	0	0	0	0	0	0	0
Gtalk	0	0	0	0	0	0	2	0	0	0	1	0
Hangout	0	0	0	0	0	0	1	1	0	0	0	0
Internet	1	0	0	0	0	0	0	0	0	0	0	0
meeting	1	2	0	0	0	0	1	0	0	0	0	0
micro blog	0	0	0	0	0	0	1	0	1	0	0	0
mobile	1	0	0	1	0	1	1	1	1	0	0	0
mobile phone call	0	0	0	0	0	0	1	0	1	0	0	0
MSN	0	0	0	2	0	0	3	0	0	0	0	0
online chatting	0	0	0	1	0	0	0	0	0	0	0	0
Optus	0	0	0	1	0	0	0	0	0	0	0	0
phone	1	0	1	0	2	2	1	0	0	0	0	0
phone call	0	0	0	0	0	0	1	0	2	1	1	1
postcard	0	0	0	0	0	0	1	0	0	0	0	0
QQ	0	0	0	2	3	3	3	3	3	0	0	0
renren.com	0	0	0	1	1	1	0	1	0	0	0	0
Skype	0	0	0	0	0	0	0	0	0	1	0	0
sms	0	0	0	0	0	0	0	0	0	1	1	1
SNS website	0	0	0	0	0	0	1	0	0	0	0	0
social network	1	0	1	0	0	0	0	0	0	0	0	0
social activity	0	0	0	0	0	0	1	0	0	0	0	0
telephone	1	0	1	0	0	0	0	0	1	0	0	0
telephone calls	0	0	0	0	0	0	0	0	1	0	0	0
Telstra	0	0	0	1	1	0	0	0	0	0	0	0
text message	1	0	1	1	0	0	3	2	2	0	0	0

Term / Item	Group A			Group B			Group C			Group D		
Twitter	0	0	0	0	0	0	1	0	0	2	0	0
video talk	0	0	0	0	0	0	1	1	0	0	0	0
Vodafone	0	0	0	1	0	0	0	0	0	0	0	0
voice message	0	0	0	0	0	0	1	1	0	0	0	0
web-mail	0	0	0	0	0	0	0	1	0	0	0	0
what's up	0	0	0	0	0	0	0	0	0	1	0	0
Sort Totals	11	6	5	16	11	13	34	18	17	8	3	3

Table 55: Unique term/item counts for each focus group and each sort (Sort 1= Here, Sort 2 = Arrival, Sort 3 = Home)

14.2. Phase Two tables

14.2.1. Demographic questions

Mean	Median	Mode	Min	Max
26.92	25	23	20	65

Table 56: Responses to questions 1(a)

Question 1(c)			Question 1(b)		
Response Category	Count	%	Gender	Count	%
Yes	15	23.81	Male	31	49.21
No	48	76.19	Female	32	50.79

Table 57: Responses to questions 1(b), 1(c)

Response category	Frequency	%	Response category	Frequency	%
English	15	23.81	Amharic	1	1.59
Chinese (mandarin)	13	20.63	Japanese	1	1.59
Malay	4	6.35	Italian	1	1.59
Arabic	4	6.35	Arabic/French	1	1.59
Spanish	3	4.76	Oromo	1	1.59
Nepali	2	3.17	Telugu	1	1.59
German	2	3.17	Polish	1	1.59
Mandarin	2	3.17	Hindi	1	1.59
Korean	1	1.59	French	1	1.59
Bahasa Indonesia	1	1.59	Arabic	1	1.59
Hokkien	1	1.59	Bengali	1	1.59
Indonesian	1	1.59	Punjabi	1	1.59
Cantonese	1	1.59	Tetum	1	1.59

Table 58: Response to questions 1(d)

Response category	Frequency	%	Response category	Frequency	%
China	13	20.63	Argentina	1	1.59
Malaysia	11	17.46	Italy	1	1.59
Singapore	8	12.70	Chile	1	1.59
Saudi Arabia	5	7.94	Lebanon	1	1.59
India	3	4.76	Switzerland	1	1.59
Indonesia	2	3.17	Germany	1	1.59
United States	2	3.17	Taiwan	1	1.59
Nepal	2	3.17	Poland	1	1.59
Ethiopia	2	3.17	Pakistani	1	1.59
Korea, Republic of	1	1.59	Bangladesh	1	1.59
Japan	1	1.59	Spain	1	1.59
South Africa	1	1.59	East Timor	1	1.59

Table 59: Response to questions 1(e)

14.2.2. Questions about experience of travel, study and living in Australia

Questions 2(a)			Questions 2(b)		Questions 2(c)	
Response category	Frequency	%	Frequency	%	Frequency	%
Yes	47	74.60	22	34.92	22	34.92
No	16	25.40	25	39.68	41	65.08
N/A	0	0	16	25.40	0	0

Table 60: Responses to questions 2(a), (b) and (c)

Response category	ELICOS		VET		School		Other		None	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Yes	9	14.29	1	1.59	3	4.76	5	7.94	40	63.49
No	54	85.71	62	98.41	60	95.24	58	92.06	23	36.51

Table 61: Responses to questions 2(d)

Response Category	Frequency	%
Bachelor's Degree	26	41.27
Postgraduate (Research) Degree	21	33.33
Postgraduate (Course Work) Degree	15	23.81
Other Course	0	0.00
Diploma	1	1.59

Table 62: Responses to questions 2(e)

Response Category	Frequency	%
Hobart	52	82.54
Launceston	11	17.46
Other	0	0

Table 63: Response to questions 2(f)

Response Categories	Frequency	%
First Year	27	42.86
Second Year	15	23.81
Third Year	14	22.22
Fourth Year	4	6.35
Fifth Year or more	3	4.76

Table 64: Responses to questions 2(g)

Response Categories	Question 2(h)		Question 2(i)	
	Frequency	%	Frequency	%
Yes	30	47.62	14	22.22
No	33	52.38	13	20.63
N/A	0	0	36	57.14

Table 65: Responses to questions 2(h), (i)

14.2.3. Questions about living arrangements in Tasmania

Mean	Median	Mode	Min	Max
21.22	18	24	1	96

Table 66: Responses to questions 3(a)

Response Category	Freq.	%	Response Category	Freq.	%
Family	30	47.62	Australian government scholarship	2	3.17
University Scholarship	13	20.63	Uni & QMS-CSIRO scholarship	1	1.59
Home country government scholarship	7	11.11	Other sponsored scholarship	1	1.59
Own funds	5	7.94	Government or state funding	1	1.59
Employer	3	4.76			

Table 67: Responses to questions 3(b)

Response Category	Freq.	%	Response Category	Freq.	%
With friends	19	30.16	In a 'home stay' arrangement	3	4.76
By yourself	15	23.81	University Accommodation	1	1.59
In shared accommodation	14	22.22	flat with partner	1	1.59
With family or relatives	9	14.29	with husband	1	1.59

Table 68: Responses to questions 3(c)

Response category	Questions 3(d)		Question 3(e)		Questions 3 (f)	
	Freq.	%	Freq.	%	Freq.	%
Yes	32	50.79	57	90.48	27	42.86
No	31	49.21	5	7.94	35	55.56
N/A	0	0	1	1.59	1	1.59

Table 69: Responses to questions 3(d), (e), (f)

Response Categories	No		Yes		N/A	
	Frequency	%	Frequency	%	Frequency	Total
Laptop or Netbook	1	1.59	62	98.41	0	63
Tablet Computer	41	65.08	22	34.92	0	63
E-Reader	57	90.48	6	9.52	0	63

Table 70: Responses to questions 3(g)

14.2.4. Questions about mobile phone ownership

Response categories	Questions 4(a)		Questions 4(c)	
	Frequency	%	Frequency	%
Yes	63	100.00	17	26.98
No	0	0	43	68.25
N/A	0	0	3	4.76

Table 71: Responses to questions 4(a), (c)

	Question 4(d)	Questions 4(g)
Arithmetic mean	16.55	48.25
Median	11	40
Mode	3	30
Min	1	10
Max	60	110

Table 72: Responses to questions 4(d), (g)

Response categories	Frequency	%
Yes	56	88.89
No	5	7.94
N/A	2	3.17

Table 73: Responses to questions 4(e)

Response categories	Frequency	%
iPhone	28	44.44
Android Phone	23	36.51
Windows Phone	1	1.59
Blackberry	1	1.59
Other	7	11.11
N/A	3	4.76

Table 74: Responses to questions 4(f)

14.2.5. Questions about mobile phone use

Response categories	Frequency	%
Very Good	25	39.68
Good	25	39.68
Okay	10	15.87
Poor	0	0.00
Very Poor	1	1.59
N/A	2	3.17

Table 75: Responses to questions 5(a)

Items/Response categories	Several times a day	Once a day	A few times a week	Less often	Never	N/A
Q43: Send or receive a text message (SMS or MMS)	31	6	17	9	0	0
Q44: Use or download software applications (Apps)	9	7	19	20	6	2
Q45: Send or receive an email	29	7	12	8	7	0
Q46: Access the internet using a web browser	41	4	8	5	5	0
Q47: Use social media (such a Facebook, Twitter etc.)	40	4	9	5	5	0
Q48: Take a picture	19	8	25	9	2	0
Q49: Record some audio	3	2	10	32	15	1
Q50: Record a video	1	3	10	36	13	0

Table 76: Responses to questions 5(b)

Items/Response categories	Yes	Uncertain	No	N/A
Q51: Accommodation	27	2	33	1
Q52: Transportation	42	2	18	1
Q53: Finances	36	2	24	1
Q54: Health	22	13	27	1
Q55: Support services	23	12	26	2
Q56: Your study	46	3	13	1
Q57: Employment	18	16	28	1
Q58: Food or other essential items for you daily life?	35	10	16	2

Table 77: Responses to questions 5(c)

Response categories	Question 5(d)	Question 5(e)	Question 5(g)
	Frequency	Frequency	Frequency
Yes	55	52	46
No	7	9	11
N/A	1	2	6

Table 78: Responses to questions 5(d), (e), (g)

Response category	Frequency
Not significantly 1	3
2	5
3	7
4	23
Very Significantly 5	25

Table 79: Responses to questions 5(h)

14.2.6. Mokken Scale Analysis tables

Question 5.c : H_{ij}																	H_i	
	Q51	**se**	**Q52**	**se**	**Q53**	**se**	**Q54**	**se**	**Q55**	**se**	**Q56**	**se**	**Q57**	**se**	**Q58**	**se**	**H**	**se**
Q51			0.81	-0.123	0.575	-0.145	0.421	-0.13	0.519	-0.126	0.67	-0.178	0.183	-0.143	0.371	-0.17	0.483	-0.087
Q52	0.81	-0.123			0.624	-0.148	0.646	-0.165	0.621	-0.161	0.782	-0.119	0.396	-0.2	0.571	-0.131	0.639	-0.076
Q53	0.575	-0.145	0.624	-0.148			0.498	-0.145	0.351	-0.145	0.475	-0.189	0.32	-0.155	0.414	-0.128	0.464	-0.084
Q54	0.421	-0.13	0.646	-0.165	0.498	-0.145			0.562	-0.109	0.874	-0.09	0.142	-0.142	0.439	-0.132	0.481	-0.08
Q55	0.519	-0.126	0.621	-0.161	0.351	-0.145	0.562	-0.109			0.876	-0.089	0.126	-0.14	0.24	-0.152	0.442	-0.089
Q56	0.67	-0.178	0.782	-0.119	0.475	-0.189	0.874	-0.09	0.876	-0.089			0.582	-0.192	0.584	-0.169	0.686	-0.097
Q57	0.183	-0.143	0.396	-0.2	0.32	-0.155	0.142	-0.142	0.126	-0.14	0.582	-0.192			0.322	-0.165	0.264	-0.104
Q58	0.371	-0.17	0.571	-0.131	0.414	-0.128	0.439	-0.132	0.24	-0.152	0.584	-0.169	0.322	-0.165			0.421	-0.096
Question 5.b : H_{ij}																	H_i	
	Q43	**se**	**Q44**	**se**	**Q45**	**se**	**Q46**	**se**	**Q47**	**se**	**Q48**	**se**	**Q49**	**se**	**Q50**	**se**	**H**	**se**
Q43			0.036	-0.17	0.242	-0.125	0.157	-0.144	0.137	-0.145	0.515	-0.117	0.32	-0.171	0.464	-0.153	0.244	-0.109
Q44	0.036	-0.17			0.736	-0.074	0.67	-0.137	0.51	-0.156	0.269	-0.151	0.398	-0.111	0.544	-0.113	0.46	-0.087
Q45	0.242	-0.125	0.736	-0.074			0.681	-0.104	0.641	-0.112	0.393	-0.137	0.369	-0.144	0.56	-0.128	0.528	-0.076
Q46	0.157	-0.144	0.67	-0.137	0.681	-0.104			0.727	-0.104	0.63	-0.112	0.365	-0.208	0.367	-0.229	0.55	-0.095
Q47	0.137	-0.145	0.51	-0.156	0.641	-0.112	0.727	-0.104			0.712	-0.102	0.237	-0.187	0.383	-0.197	0.517	-0.097
Q48	0.515	-0.117	0.269	-0.151	0.393	-0.137	0.63	-0.112	0.712	-0.102			0.612	-0.121	0.647	-0.122	0.523	-0.088
Q49	0.32	-0.171	0.398	-0.111	0.369	-0.144	0.365	-0.208	0.237	-0.187	0.612	-0.121			0.84	-0.056	0.443	-0.1
Q50	0.464	-0.153	0.544	-0.113	0.56	-0.128	0.367	-0.229	0.383	-0.197	0.647	-0.122	0.84	-0.056			0.546	-0.102

Table 80: Coefficient H_{ij}

Question 5.b : H		**Question 5.c : H**	
ScaleH	se	ScaleH	se
0.478	-0.08	0.477	-0.071

Table 81: Coefficient H

Question 5.b : H_{ij}															**H_i**	
Item	**Q44**	**se**	**Q45**	**se**	**Q46**	**se**	**Q47**	**se**	**Q48**	**se**	**Q49**	**se**	**Q50**	**se**	**H**	**se**
Q44			0.736	-0.074	0.67	-0.137	0.51	-0.156	0.269	-0.151	0.398	-0.111	0.544	-0.113	0.532	-0.084
Q45	0.736	-0.074			0.681	-0.104	0.641	-0.112	0.393	-0.137	0.369	-0.144	0.56	-0.128	0.584	-0.08
Q46	0.67	-0.137	0.681	-0.104			0.727	-0.097	0.63	-0.112	0.365	-0.208	0.367	-0.229	0.618	-0.096
Q47	0.51	-0.156	0.641	-0.112	0.727	-0.097			0.712	-0.102	0.237	-0.187	0.383	-0.197	0.582	-0.096
Q48	0.269	-0.151	0.393	-0.137	0.63	-0.112	0.712	-0.102			0.612	-0.121	0.647	-0.122	0.525	-0.098
Q49	0.398	-0.111	0.369	-0.144	0.365	-0.208	0.237	-0.187	0.612	-0.121			0.84	-0.063	0.46	-0.105
Q50	0.544	-0.113	0.56	-0.128	0.367	-0.229	0.383	-0.197	0.647	-0.122	0.84	-0.063			0.557	-0.108
Question 5.c : H_{ij}															**H_i**	
Item	**Q44**	**se**	**Q45**	**se**	**Q46**	**se**	**Q47**	**se**	**Q48**	**se**	**Q49**	**se**	**Q50**	**se**	**H**	**se**
Q51			0.81	-0.123	0.575	-0.145	0.421	-0.13	0.519	-0.126	0.67	-0.178	0.371	-0.17	0.541	-0.097
Q52	0.81	-0.123			0.624	-0.148	0.646	-0.165	0.621	-0.161	0.782	-0.119	0.571	-0.127	0.671	-0.07
Q53	0.575	-0.145	0.624	-0.148			0.498	-0.145	0.351	-0.138	0.475	-0.189	0.414	-0.128	0.487	-0.09
Q54	0.421	-0.13	0.646	-0.165	0.498	-0.145			0.562	-0.105	0.874	-0.09	0.439	-0.132	0.545	-0.085
Q55	0.519	-0.126	0.621	-0.161	0.351	-0.138	0.562	-0.105			0.876	-0.089	0.24	-0.152	0.5	-0.091
Q56	0.67	-0.178	0.782	-0.119	0.475	-0.189	0.874	-0.09	0.876	-0.089			0.584	-0.169	0.699	-0.097
Q58	0.371	-0.17	0.571	-0.127	0.414	-0.128	0.439	-0.132	0.24	-0.152	0.584	-0.169			0.435	-0.099

Table 82: Coefficient H_{ij} for two seven item scales

Question : 5.b *H*		**Questions 5.c : *H***	
ScaleH	se	ScaleH	se
0.557	-0.082	0.546	-0.069

Table 83: Coefficient H for two seven item scales

Question 5.b seven item scale MIIO with minsize 10											Backward Selection	
Item	ItemH	#ac	#vi	#vi/#ac	maxvi	sum	sum/#ac	tmax	#tsig	crit	Item	Step
Q50	0.56	20	0	0	0	0	0	0	0	0	Q50	0
Q49	0.46	20	0	0	0	0	0	0	0	0	Q49	0
Q44	0.53	20	0	0	0	0	0	0	0	0	Q44	0
Q48	0.52	22	3	0.14	0.37	0.79	0.0361	0.88	0	90	Q48	0
Q45	0.58	20	2	0.1	0.37	0.64	0.0321	0.88	0	78	Q45	0
Q47	0.58	20	2	0.1	0.31	0.46	0.0231	0.67	0	61	Q47	0
Q46	0.62	20	1	0.05	0.31	0.31	0.0154	0.67	0	45	Q46	0

Table 84: MIIO for seven items of question 5.b

Question 5.c seven item scale MIIO with minsize 5											Backward Selection	
Item	ItemH	#ac	#vi	#vi/#ac	maxvi	sum	sum/#ac	tmax	#tsig	crit	Item	Step
Q54	0.55	34	5	0.15	0.27	0.97	0.0286	0.74	0	74	Q54	0
Q55	0.5	36	6	0.17	0.67	2.1	0.0583	1.34	0	155	Q55	0
Q51	0.54	34	9	0.26	0.67	2.5	0.0735	1.34	0	180	Q51	0
Q53	0.49	33	5	0.15	0.5	1.33	0.0402	1.13	0	115	Q53	0
Q58	0.44	36	6	0.17	0.67	1.92	0.0532	1.46	0	153	Q58	0
Q52	0.67	33	6	0.18	0.67	1.95	0.0591	1.46	0	149	Q52	0
Q56	0.7	36	7	0.19	0.25	1.1	0.0306	1	0	73	Q56	0

Table 85: MIIO for seven items of question 5.c with minsize 5

Question : 5.b H^T	Questions 5.c : H^T
0.643246	0.245425

Table 86: Coefficient H^T for seven item scales

Question 5.b item monotonicity, minsize = 10										
Item	ItemH	#ac	#vi	#vi/#ac	maxvi	sum	sum/#ac	zmax	#zsig	crit
Q43	0.24	30	8	0.27	0.28	0.81	0.027	0.9	0	101
Q44	0.46	27	3	0.11	0.16	0.36	0.0132	0.45	0	42
Q45	0.53	23	1	0.04	0.1	0.1	0.0043	0	0	11
Q46	0.55	14	1	0.07	0.07	0.07	0.0048	0.1	0	10
Q47	0.52	27	2	0.07	0.1	0.18	0.0066	0.16	0	19
Q48	0.52	18	0	0	0	0	0	0	0	0
Q49	0.44	19	4	0.21	0.11	0.33	0.0172	0.18	0	50
Q50	0.55	15	4	0.27	0.08	0.27	0.0178	0.25	0	48
Question 5.b item monotonicity, minsize = 15										
Q43	0.24	9	1	0.11	0.06	0.06	0.0063	0.12	0	29
Q44	0.46	9	0	0	0	0	0	0	0	0
Q45	0.53	7	1	0.14	0.1	0.1	0.0142	0.23	0	32
Q46	0.55	6	0	0	0	0	0	0	0	0
Q47	0.52	9	1	0.11	0.12	0.12	0.0139	0.5	0	33
Q48	0.52	9	0	0	0	0	0	0	0	0
Q49	0.44	8	1	0.12	0.04	0.04	0.0052	0.28	0	19
Q50	0.55	8	1	0.12	0.04	0.04	0.0052	0.24	0	13
Question 5.b item monotonicity, minsize = 20										
Q43	0.24	3	1	0.33	0.04	0.04	0.0129	0.07	0	56
Q44	0.46	3	0	0	0	0	0	0	0	0
Q45	0.53	2	0	0	0	0	0	0	0	0
Q46	0.55	4	0	0	0	0	0	0	0	0
Q47	0.52	3	0	0	0	0	0	0	0	0
Q48	0.52	3	0	0	0	0	0	0	0	0
Q49	0.44	3	0	0	0	0	0	0	0	0
Q50	0.55	3	0	0	0	0	0	0	0	0

Table 87: Question 5.b item monotonicity tested with minsize 10, 15 and 20

Question 5.c item monotonicity, minsize = 5										
Item	ItemH	#ac	#vi	#vi/#ac	maxvi	sum	sum/#ac	zmax	#zsig	crit
Q51	0.48	34	7	0.21	0.22	0.98	0.0289	0.33	0	76
Q52	0.64	10	3	0.3	0.21	0.51	0.0508	0.31	0	95
Q53	0.46	30	2	0.07	0.31	0.53	0.0176	0.78	0	60
Q54	0.48	31	7	0.23	0.49	1.36	0.0438	1.46	0	128
Q55	0.44	44	14	0.32	0.4	2.28	0.0518	0.88	0	139
Q56	0.69	14	2	0.14	0.11	0.15	0.0108	0.27	0	23
Q57	0.26	42	16	0.38	0.63	4.12	0.0981	1.94	2	254
Q58	0.42	25	9	0.36	0.42	1.79	0.0717	1.02	0	164
Question 5.c item monotonicity, minsize = 10										
Q51	0.48	12	0	0	0	0	0	0	0	0
Q52	0.64	5	2	0.4	0.1	0.19	0.0379	0.09	0	76
Q53	0.46	12	0	0	0	0	0	0	0	0
Q54	0.48	9	0	0	0	0	0	0	0	0
Q55	0.44	20	0	0	0	0	0	0	0	0
Q56	0.69	7	0	0	0	0	0	0	0	0
Q57	0.26	20	4	0.2	0.22	0.51	0.0257	0.64	0	81
Q58	0.42	16	1	0.06	0.21	0.21	0.013	0.64	0	42
Question 5.c item monotonicity, minsize = 15										
Q51	0.48	6	0	0	0	0	0	0	0	0
Q52	0.64	2	0	0	0	0	0	0	0	0
Q53	0.46	6	0	0	0	0	0	0	0	0
Q54	0.48	4	0	0	0	0	0	0	0	0
Q55	0.44	6	0	0	0	0	0	0	0	0
Q56	0.69	4	0	0	0	0	0	0	0	0
Q57	0.26	6	1	0.17	0.11	0.11	0.0177	0.35	0	52
Q58	0.42	6	0	0	0	0	0	0	0	0

Table 88: Question 5.c item monotonicity tested with minsize 5, 10 and 15

Question 5.b seven item monotonicity, minsize = 10										
	ItemH	#ac	#vi	#vi/#ac	maxvi	sum	sum/#ac	zmax	#zsig	crit
Q44	0.53	24	4	0.17	0.39	0.68	0.0284	1.58	0	90
Q45	0.58	23	3	0.13	0.07	0.18	0.008	0.2	0	20
Q46	0.62	23	5	0.22	0.1	0.43	0.0187	0.18	0	44
Q47	0.58	15	1	0.07	0.04	0.04	0.0027	0.26	0	3
Q48	0.52	28	6	0.21	0.42	0.93	0.0332	1.52	0	104
Q49	0.46	15	6	0.4	0.17	0.52	0.0345	0.44	0	95
Q50	0.56	13	5	0.38	0.17	0.48	0.0372	0.49	0	91
Question 5.b seven item monotonicity, minsize = 15										
Q44	0.53	3	0	0	0	0	0	0	0	0
Q45	0.58	7	1	0.14	0.11	0.11	0.0151	0.32	0	31
Q46	0.62	6	0	0	0	0	0	0	0	0
Q47	0.58	9	2	0.22	0.15	0.19	0.0211	0.77	0	53
Q48	0.52	8	1	0.12	0.09	0.09	0.0109	0.26	0	26
Q49	0.46	8	2	0.25	0.09	0.13	0.0157	0.38	0	48
Q50	0.56	7	3	0.43	0.12	0.2	0.0293	0.52	0	79
Question 5.b seven item monotonicity, minsize = 20										
Q44	0.53	3	0	0	0	0	0	0	0	0
Q45	0.58	2	0	0	0	0	0	0	0	0
Q46	0.62	4	0	0	0	0	0	0	0	0
Q47	0.58	3	0	0	0	0	0	0	0	0
Q48	0.52	3	0	0	0	0	0	0	0	0
Q49	0.46	3	0	0	0	0	0	0	0	0
Q50	0.56	3	0	0	0	0	0	0	0	0

Table 89: Question 5.b monotonicity with seven items testing minsize at 10, 15 and 20

Question 5.c seven item monotonicity, minsize = 5										
	ItemH	#ac	#vi	#vi/#ac	maxvi	sum	sum/#ac	zmax	#zsig	crit
Q51	0.54	22	3	0.14	0.12	0.36	0.0165	0.2	0	39
Q52	0.67	6	2	0.33	0.33	0.37	0.0619	0.99	0	121
Q53	0.49	42	5	0.12	0.47	0.81	0.0193	0.93	0	84
Q54	0.54	25	3	0.12	0.21	0.37	0.0148	0.23	0	44
Q55	0.5	36	5	0.14	0.26	0.77	0.0214	0.37	0	63
Q56	0.7	17	6	0.35	0.2	0.61	0.0361	0.48	0	84
Q58	0.44	30	9	0.3	0.55	2.12	0.0708	1.36	0	173
Question 5.c seven item monotonicity, minsize = 10										
Q51	0.54	12	0	0	0	0	0	0	0	0
Q52	0.67	6	1	0.17	0.11	0.11	0.019	0.12	0	33
Q53	0.49	12	0	0	0	0	0	0	0	0
Q54	0.54	9	0	0	0	0	0	0	0	0
Q55	0.5	16	1	0.06	0.04	0.04	0.0022	0.25	0	6
Q56	0.7	8	1	0.12	0.1	0.1	0.0125	0.07	0	19
Q58	0.44	12	3	0.25	0.33	0.57	0.0476	1.07	0	113
Question 5.c seven item monotonicity, minsize = 15										
Q51	0.54	6	0	0	0	0	0	0	0	0
Q52	0.67	2	0	0	0	0	0	0	0	0
Q53	0.49	6	0	0	0	0	0	0	0	0
Q54	0.54	6	0	0	0	0	0	0	0	0
Q55	0.5	6	0	0	0	0	0	0	0	0
Q56	0.7	3	0	0	0	0	0	0	0	0
Q58	0.44	6	0	0	0	0	0	0	0	0

Table 90: Question 5.c monotonicity with seven items testing minsize at 5, 10 and 15